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Bradshaw Lecture

ON THE

VIRULENCE OF THE MICRO-ORGANISM IN INFECTIVE DISEASE.

Delivered before the Royal College of Physicians of London on Nov. 5th, 1929,

BY J. A. ARKWRIGHT, M.D. CAMB., F.R.S.,

FELLOW AND COUNCILLOR OF THE COLLEGE; ASSISTANT BACTERIOLOGIST AT THE LISTER INSTITUTE.

THE problem of virulence has been and still is among the most arresting and fundamental subjects in the study of infective disease. Like that of the Origin of Sin, which has proved a difficult knot to loose even by the combined efforts of theologians and psychologists, and the Mystery of Pain, which was dealt with in so illuminating a manner by James Hinton, a distinguished Member of the sister College, the nature of virulence in infective disease has been the subject of much speculative discourse. In the case of virulence this phase of speculation has now given way to one of fruitful experimental investigation.

Since the doctrine of *contagia viva* has been firmly established the epithet "virulent" has been transferred from the disease to the living causal parasite by a lively metaphor which envisages a venomous germ attacking the innocent animal body.

Twenty years ago it was pointed out to me by the Director of the Lister Institute that the decline in cultures of bacteria from a state of high virulence and their occasional return to malignant activity, especially during sojourn in the animal body, was still a most baffling phenomenon, and one which often presented formidable obstacles to experimental workers and frustrated therapeutic investigations; consequently that it was worthy of deliberate study, though the elucidation might be long delayed. At that time the elusiveness of virulence in cultures of *Bacillus pestis* was a constant source of difficulty in preparing and testing plague vaccine and the obstacle has not yet been entirely overcome. The reason of the behaviour of attenuated cultures of *B. anthracis*, such as were used by Pasteur for anthrax vaccination, was and still is an unsolved problem, and the matter has not yet been specially examined by more recent methods. During the last 15 or 20 years, however, a certain amount of light has been thrown on the subject from various sides.

The experimental bacteriologist is apt to seek virulent cultures and to express pleasure when he obtains them. This craving might well be the sport of the uninitiated, since superficially it suggests the practices of a professional poisoner or the infatuated action of desperate combatants in modern warfare, as dreamt of by overwrought and ill-instructed military hygienists. Let us hope, however, that these things are but the food on which nightmares are nourished.

It may be well to recall shortly the reasons for the study of virulence in disease-producing parasites.

(1) In the first place it has been the belief of clinical observers and some epidemiologists that unusual virulence of the *materies morbi* is the reason of the greater severity and higher mortality of one outbreak of infectious disease than of another. It has, however, on the other hand, been suggested that these differences are due rather to changes in the population attacked, induced by temporary causes such as climatic, or dietary changes or by more subtle factors, which bring about a greater or less resistance of the animal subject. These contingencies are very hard to determine or estimate even by the skilful collection and treatment of statistics. In the hope of understanding these occurrences and of guarding against the more severe outbreaks, it is obviously important to know to what extent the living parasitic agent which excites the disease can itself vary, and to find out whether this change can be controlled. Again (2) the experimental pathologist often desires to have at hand a uniformly and sometimes an excessively active causal micro-organism in order to produce at will some disease in animals, for the study of all its features and especially so as to be able to test various remedial or preventive measures. For these purposes it may be necessary to make observations on a series of animals inoculated with uniform doses of the infective agent. (3) Knowledge and control of virulence are particularly important when actual cultures of the pathogenic agent, alive or dead, are used for prophylactic purposes. Moreover, in certain instances one culture or sample of pathogenic material will produce a mild attack which protects against the more severe, as in vaccinia, rabies, fowl-pox, and anthrax. For such purposes cultures or "inocula" of both weak and strong virulence but containing microbes otherwise the same are needed for experiment. Also (4), the use of dead bacteria as prophylactic "vaccines" has introduced the question whether it is needful that the cultures should have had all the properties of pathogenicity when they were alive, or whether virulence and toxicity are mere excrescences which may cause undesirable symptoms, even when the cultures used are dead, but that these qualities are not essential in order to stimulate the apparatus of defence. In the case of the allied procedure for producing antitoxin it is, of course, now well known that certain toxins, such as diphtheria toxin, can be changed into toxoids, or anatoxin, which has no obvious poisonous action but yet can be used to produce antitoxin in the bodies of man and animals. But the desirability of using virulent bacterial cultures for vaccines has been comparatively little studied.

For all these reasons the study and control of virulence are of prime importance.

(5) Allied to changes in virulence, but probably not due to exactly the same factors, are the changes in pathogenic bacteria, protozoa, and viruses which so adapt them to the animal host that they cause disease in one species but not in another. One may adduce many modern instances which appear in the recent work on pasteurellosis or hæmorrhagic septicæmia of animals, vaccinia, distemper, foot-and-mouth disease, herpes, &c. It is obvious, therefore, that variation in virulence is no idle study.

It is, then, of the *variability* of bacteria as regards their virulence and their capacity for harmful action on the bodies of animals that I wish to treat.

THE MEANING OF VIRULENCE.

Virulence in the general sense is the property by which a pathogenic micro-organism causes death or reaction of the part or parts of the body invaded and so leads to disease. Infective disease may be defined as the resultant or sum of the action of the infecting agent and the reaction of the body.

It has sometimes been objected that it is idle to speak of the virulence of a bacterium, since this quality depends on the interaction of the micro-organism and the animal which it infects and on the conditions which it finds in its host. The reason given for this opinion is in itself very true, but since the great variability of strains or races of pathogenic bacteria is now well recognised it has become clear that differences in the characters of different cultures of the same microbe may be such as to render it highly active or almost inert in respect of disease production, when introduced into the body even of a highly susceptible animal. A more just criticism is that the term virulence, as often used, includes a number of different qualities. The different forms of pathogenic action no doubt often combine to produce the result so that it is difficult to say which is most active in a given case. Since, however, I wish to deal chiefly with a particular part of the subject, I must make an attempt to analyse the property of pathogenicity and show how the different qualities affect

infection and what concerns their development in bacteria.

Infection and Pathogenicity.

When the bacteria obtain intimate contact with the animal body several different results may follow. I will mention three. (1) The bacteria may kill the animal or parts of the tissues by means of exotoxins, or of endotoxins without seriously invading the host. (2) The bacteria may have active properties which stimulate reaction and the host kills them out because they cannot resist the destructive powers of the body fluids and cells. (3) Virulent bacteria may invade by a more special method. The animal tissues react to their presence by producing effusions of liquids and cells which are unable to harm the bacteria and indeed afford a favourable pabulum for the invaders. Not only so, but as we shall see later there is reason to believe that the tissue juices of the normal susceptible animal may actually promote variation of the bacteria in the direction of increased virulence.

The reaction of the host is apt to be regarded as purposive and protective in effect, and no doubt this teleological language is almost unavoidable. Considered in detail, however, without preconceptions, the reaction appears in many cases merely as an inevitable result of the presence of the invaders and their products, almost comparable to the osmotic outflow of water when a dressing of strong salt solution or glycerin is applied to a wound or ulcer. On either view the protective result of such reaction is not necessarily successful.

True virulence or invasive power perhaps means that the invading microbe is so constituted that the first reaction of the host is favourable to its infecting progress, and this may be the chief difference between a virulent and a non-virulent organism. Effusions of liquid which are unable to kill often appear to an unprejudiced observer actually to help the bacteria. Even leucocytes may not be disadvantageous if they take up but cannot kill and digest the microbes. They may then help them to spread by transporting them to other parts of the body. They may even form suitable sites for the multiplication of the bacteria, as appears to happen in gonorrhœa and cerebro-spinal meningitis when the polymorphonuclear leucocytes certainly do not soon kill all the bacteria they engulf.

This hypothesis is difficult to prove, but in some cases there seems to be nothing but hypothesis opposed to it. In pneumonia the effusion of lymph certainly seems to be a good culture medium for the pneumococcus, and there is reason to think that in foot-and-mouth disease the amount of virus present is in direct proportion to the serous effusion, for if the foot of a guinea-pig inoculated with foot-and-mouth virus is protected from the pressure of the weight of the body the formation of vesicles may be avoided, and at the same time, apparently in consequence, the local production of virus is comparatively small, as has been shown by Mrs. M. C. Maitland. An instance of the same kind of thing is suggested by common clinical experience of streptococcal and staphylococcal infections. If an inflamed part, such as the hand or forearm, with a so-called poisoned wound is used or is allowed to hang down, the cellulitis is made worse, and with the greater effusion of lymph the infection is also enhanced. It is true that by Bier's treatment local infections may be cured, but this passive effusion of serous fluids is not quite the same thing, and their composition is perhaps not quite like that which the virulent invader provokes. Perhaps one might say that the exudate produced by constriction or suction is not of that kind which the pathogenic streptococci have learnt in the course of their evolution to use for their own ends, or it may be that Bier's exudate only deals with bacteria of low virulence.

This theory requires more experimental support, but it is difficult to believe that such a process involving assistance from the host takes no part in the invasion of virulent as opposed to the destruction of non-virulent bacteria. The alternative view is that the hostile products of the animal body exercise a stringent selection and promote the survival of the fittest microbes, which then proceed to invade the tissues. The chief difference in the former hypothesis is that the highly virulent culture is supposed already to possess these resistant and invasive properties, so that at the time of entry it is capable of making use of the attempted defence of the body and turning it to its own advantage.

For the purposes of this lecture I mean by virulence the power to invade and multiply in the tissues of the host without considering too closely the method of attack, but excluding pure toxic action.

Recent Observations which have Influenced our Views regarding Virulence.

It so happens that of late light has been thrown from different sides on the subject. The scattered threads of irregular observations have been drawn nearer together, and signs of more orderly connexion are now appearing. This leads to a hope that a reasonable means of control of virulence is in process of being formulated. The advance of knowledge has proceeded from different sides, and there are three distinct roads which converge to the attack on the problem.

(1) *Epidemiological Experiments.*—The original and illuminating work of Topley and Greenwood on experimental epidemiology, which has been expounded by Prof. Topley in the Goulstonian (1919) and Milroy (1926) Lectures before this College, has shown the dependence of the progress of an epidemic on the addition to the community of new susceptible subjects which feed the flame like fuel thrown on to the fire. This process has been demonstrated to depend on a deep-rooted reality, and not to be a mere figure of speech. These well-founded conclusions, and the data on which they rest, strongly suggest an increase in the virulence of the infective agent in the course of the epidemic as the result of its entering and infecting a series of new hosts.

This is not a new idea, but direct observation of the infecting bacteria isolated at different stages of an epidemic has not so far brought much confirmation. Examination of culture isolated at the height of an epidemic has not shown them to have greater virulence than those isolated at a milder stage, whether early or late. The failure may quite possibly be due to the great difficulty of determining the virulence of cultures with any exactitude and to other experimental hindrances. The occurrence of an advance in virulence with the progress of an epidemic is a probable but unproved hypothesis. In the more intimate field of experimental bacteriology, however, it is well known that "passage" through a susceptible animal of a bacterium which had been kept in artificial culture would often greatly enhance its activity and pathogenicity—e.g., streptococcus, *Vibrio choleræ* for guinea-pigs, and *B. anthracis*, the plague bacillus, &c. Still it has been doubted whether a state of deterioration like that found in artificial culture is really a factor determining the course of "natural" disease.

Topley, Greenwood, Wilson, and Newbold in 1928 were able to show that strains of *B. aertrycke* of low virulence were still able to produce epidemics in mice of a mild character, and those of higher virulence more severe and fatal epidemics, showing that virulence as determined artificially by inoculation had an influence on the course of disease acquired naturally and on its epidemiology.

(2) *Chemical Composition of Bacteria.*—Another main line of advance has been in the field of biochemistry, especially by the chemical analysis of bacteria and the discovery of components which condition active virulence or pathogenicity. This work has been carried on of late years, especially in America by Landsteiner, Heidelberger, and others, and H. W. Dudley amongst workers in this country has added to knowledge in this department. This chemical inquiry is a subject which I have no competence to discuss in detail, but the definiteness of the results obtained encourage workers along more old-fashioned bacteriological lines to believe that their own concordant results also represent real additions to knowledge.

The application of chemical researches to bacterial variation will be pointed out later. The two branches of investigation have helped each other, and, as will be seen later, much of the older chemical work was less fruitful than it might have been because bacteria were regarded too much as a whole, without appreciating that they might consist of separate parts of diverse function and composition. In consequence, the variation of these parts when it occurred was taken to mean a change in a single chemical substance, instead of independent variations quantitative and qualitative in the separate parts or "organs" of the bacillus. It is now known that both these kinds of changes occur, but the speculations of former days did not give a correct interpretation of the facts.

(3) *Bacterial Variation.*—The lines along which more strictly defined bacteriology is progressing are those which I chiefly desire to emphasise. They are based on the evidence of variability of bacteria, especially as regards virulence amongst other characters which has received much attention of late years. Finished results must not be expected at present. Suggestive facts and a few experimental hints are all that can be boasted of as yet, but they are of great promise.

There are two main aspects of variation in virulence, and it is necessary to consider them separately. The first is the evidence of their different behaviour in the animal body, and the second is the evidence of variation in the morphology of the bacteria and their colonies and in their chemical composition and properties in vitro.

Varied Behaviour of Organisms in the Body.

Variation in toxigenicity.—In artificial cultures the same strain of a bacillus may vary very much from time to time in the concentration of toxin which it will yield, a fact which is the bugbear of those whose duty it is to obtain a "good" toxin for the production of antitoxin. Non-toxigenic variants of the diphtheria bacillus have been isolated from strains of high repute as toxin makers by several workers, Baerthlein, Maitland, and Crowell, though other good observers have repeatedly failed to do so.

Variation in invasive power.—Virulence in the stricter sense means ability to invade the tissues of the host and multiply there. In many cases the laboratory in-vitro tests of virulence have been made by techniques which show the readiness with which the bacteria will undergo bacteriolysis or be taken up by phagocytes or behave in the complement-fixation reactions when under the influence of specific immune serum containing antibodies. These experiments are really concerned with the question whether the particular serum fits the bacteria—i.e., contains antibodies to the special antigens in the particular cultures used. They do not indicate their capacity for infecting susceptible animals. The most desirable tests of virulence are those which show the effect of the serum and tissues of the normal susceptible animal on the bacterial strain rather than the effect of the serum of an immune animal. In practice it is the susceptible animal which is the measure of virulence and not one which is immune. At present the direct test of pathogenicity and lethal effect of inoculated cultures is the best method of estimating virulence, but this is open to many special difficulties and fallacies, and it is partly on this account that the more easily recognisable characters of cultures in vitro which are correlated with virulence are of special value.

Variations in virulence shown by animal experiment.—The virulence of different cultures of the same strain of the same kind of micro-organism may vary enormously as shown by animal experiment. The pneumococcus and streptococcus are well known instances of this. Griffith obtained two variants of a single strain of pneumococcus with very wide differences in virulence. Dr. G. F. Gaskell in a former Bradshaw lecture described the pathology of pneumonia in rabbits which had been produced by the inoculation of cultures of different virulence. He found the variation in virulence such that the minimum lethal dose for a mouse varied between 1·0 c.cm. and one ten-millionth of 1·0 c.cm. of an 18 hours' broth culture. Eagles examined four different variants of a single strain of streptococcus and found that their lethal doses varied from 10 million to 100 cocci. G. S. Wilson injected mice with virulent and non-virulent cultures of *B. aertrycke* and found that whereas the former killed 2 mice out of 20, the virulent variant killed 18 or 19 out of 20 in one-twentieth of the dose, a difference of 1 to 180. Comparable differences may be found in *B. pestis*, *B. anthracis*, and the filtrable viruses.

Since variation in virulence of cultures is an accepted fact, several questions at once arise. What is its exact nature—i.e., what is the intimate change in the bacteria composing the cultures? How can these changes be encouraged or prevented? What other changes accompany changes in virulence? How are the changes observed to appear?

Pfeiffer in 1903 discussed the known facts and regarded the loss of virulence as of the same kind as atrophy of function from disuse, and its recovery as due to renewed opportunity for action aided by survival of the fittest—i.e., of the most virulent bacteria—in the animal body. A view essentially similar to this is perhaps the most acceptable to-day. At that time, 26 years ago, however, much ingenuity was expended in trying to fit in the facts with complicated views about haptophore and toxophore or ergophore chemical groups in the bacteria. These views dealt with substances too hypothetical to allow of profitable argument or sound conclusions and subsequent verification. Such conceptions still have their value, especially in relation to exotoxins, but seem to have led the protagonists astray. Pfeiffer and Hamburger believed that it was the antibacterial action of the amboceptors in the serum of normal animals which accelerated or brought about the change and that consequently culture in the serum or the bodies of immune animals would be still more effective in promoting virulence. Walker and Shaw attached more importance to the destructive action of the complement or alexin in this capacity. It is probable that neither as such has much influence and certainly the evidence points to the so-called amboceptor having an exactly opposite effect.

Kinds of Variation.

Variation in bacteria as in other living things may concern large or small changes, in single or in groups of characters. Such characters are motility, serological properties, manner of growth in culture, agglutinability by salt, &c., in addition to changes in virulence.

It has been considered an important question from the point of view of the geneticist whether the changes are all due to loss or may also be due to acquirement of a character. It is often hard or impossible to say which is which, for an apparent gain may be due to the loss of some inhibitory factor and vice versa. If the acquiring of the power to ferment a sugar or if the gain of a capsule and of virulence or the adaptation to a new species of host is a true gain, as these changes appear to be, then gains certainly occur as well as losses. It has been argued that the apparent acquisition of a new character is really due to the survival of the few individuals which have had this character all the time, or even to the hypertrophy of a dormant character and not to a really new acquisition. But it is not clear why such latent properties in a culture should be postulated if they cannot be observed. It seems probable that a character first appears in a few individuals, and that then its relative increase is encouraged by selection, and often the same factor in the environment which produces the first variants also favours their selection. This is very strongly indicated when a species of bacterium acquires the property of fermenting a sugar on which it did not act on in the first place. The presence of the sugar conditions the appearance of a few bacteria capable of effecting the fermentation, and these are then encouraged and selected because

they have the advantage of a new pabulum which is denied to the others. In the same way, and perhaps for the same reasons, there is a likelihood that adaptation to animal tissues and juices is produced by the presence of these tissues or their chemical constituents which first produce a new quality in the bacteria and then afford an additional nutriment to the new race which increases in consequence.

The bogy of inheritance of acquired characteristics, moreover, need have no terrors for the bacteriologist, since bacteria are not known to have differentiated reproductive organs nor to undergo conjugation or a sexual phase, though such life-histories have been described. Consequently the theoretical readjustment with reversion to type at these stages need not be taken into account. There seems to be no sound theoretical objection to hereditary variation of bacteria being influenced by direct environmental influence followed by environmental selection. Such variations have been described in the kind of variants called "clones" in protozoa which persist for long periods of repeated asexual multiplication but are believed usually to come to an end when conjugation has occurred. Such automatic intensifying action on variation by the environment which both causes variation and then selects the variant seems especially indicated in certain bacterial variations—e.g., (1) the fermentation of a new sugar, (2) adaptation of a species of bacterium to a new host, (3) increase of virulence during passage through a susceptible animal, (4) diminution of virulence during passage through immune serum, (5) the change from a non-virulent uncapsulated pneumococcus into a capsulated virulent variant, which has been described by Griffith as the result of passage through a mouse together with a dead emulsion of capsulated pneumococci.

Variations which can be Detected in Cultures.

Variants of very diverse characters can be obtained by selection of colonies on agar culture medium. Almost every known character has been observed to vary in one species of bacterium or another. By persistent selection of colonies growing on agar plates made from old broth cultures or from cultures in special media a persistent or hereditary variant can be obtained corresponding to each of these altered characters. Some of the best marked hereditary variants that can be detected in cultures must be described.

Variants are said to be hereditary when they can be kept pure by subculturing on agar at fairly short intervals without the need for fresh selection of isolated colonies. Four very distinct kinds of variants are now well known in the group of intestinal bacteria which includes *B. coli*, *B. typhosus*, and *B. paratyphosus*. Many other hereditary variants are also recognised, but these four have been shown to have a definite position as regards virulence. The four variants are as follows.

(1) The so-called normal strain recently isolated from the body. This is typically motile and makes a turbid growth in culture bouillon, and on nutrient agar forms round, dome-shaped colonies with smooth shining surface and a regular margin. This is called the smooth motile form or shortly the S.M. form.

(2) Colonies on agar of such a strain can often be found which are similar in appearance but contain only non-motile bacteria; these may be indicated as S.N.M. This variant has been called the O form by Weil and Felix because the growth in the case of *B. proteus* is different from that of the motile form. The latter makes a confluent filmy growth all over the surface of agar and consequently Weil and Felix called it the H form because of the "Hauch" or film characteristic of it. The non-motile form they described as "ohne Hauch" or "O."

(3) The next variant is also motile like the S.M. or normal, but instead of growing in smooth round shiny colonies with even edges the colonies are more or less irregular in outline, rough and uneven or dull on the surface, and of a granular and often opaque texture and a jagged outline. This has been called the Rough or R form to distinguish it from the S. Since it is motile it is also named R.M.

(4) The fourth form or R.N.M. is non-motile, like the second, but is rough like the third.

Mixed and intermediate variants occur, but these four forms can often be obtained pure with some little trouble by repeatedly selecting colonies; they will then often keep constant if transplanted at intervals of a week for very many subcultures, each of which represents hundreds of thousands of divisions or bacterial generations.

Virulence and capsule.—Perhaps the most important variants for my present purpose besides those described above are the capsulated and non-capsulated forms of pneumococcus and of the pneumobacillus of Friedländer whose colonies can be recognised on solid media. These will be again referred to later.

The four forms of variants of *B. typhosus*, &c., depend on two pairs of characters for their differentiation, motility, and absence of motility, "smoothness" and "roughness." The corresponding components are the flagella, which are responsible for motility, and the "smooth" (S) somatic antigen or the "rough" (R) somatic antigen, which constitute smoothness or roughness.

Want of Connexion between Virulence and Motility: Presence of Flagella.

As far as the evidence goes at present "motility" has no relation to virulence nor to toxigenicity. That is to say, a motile S and a non-motile S culture are both of approximately the same pathogenicity as far as is known, and the same is true of a rough motile and a rough non-motile, though in this case the pathogenicity is of a very low order.

Motility means the presence of flagella, and the presence of this constituent in emulsions of motile bacteria is shown by the manner of reaction with specific agglutinating serum. The flagellated bacteria agglutinate in large loose fluffy floccules and emulsions of the non-motile variant with agglutinating serum form small, dense granular clumps. It has, in fact, been shown that motile bacteria possess two kinds of agglutinable substances which condition the formation of clumps with specific sera, whilst the non-motile form has only one corresponding to the bodies of the bacteria which is consequently called the somatic substance as opposed to the flagellar substance. When an animal has been infected with or inoculated with motile bacteria two agglutinins appear in its serum which act on the flagella and the bodies respectively, but if a non-motile and completely unflagellated variant or species has been inoculated then the serum contains only agglutinins for the somatic antigen or agglutinable substance.

As has been pointed out above, it is the somatic substance which is most nearly related to virulence and the flagellar has not been shown to make much difference in this respect. It has also been shown that such reactions with serum in vitro as bacteriolysis, bactericidal action, and complement fixation are for the most part, if not quite entirely, concerned with the somatic part of the bacteria and are related to the nature of the somatic antigen, but they have very little indeed to do with the flagellar part. It has also been found in *some* experiments that in order to give an animal protection against a particular motile organism it is unnecessary to use a motile form or variant for the protective inoculation or vaccine. This is in harmony with what has just been said about most of the known in-vitro immunity reactions being all concerned with the somatic part of the bacteria.

The hypothesis that the elaborate flagellar apparatus of such bacteria as the typhoid or paratyphoid bacillus is of no importance as regards pathogenicity is at first sight rather startling, but it is borne out by certain other facts. It has been observed that motility varies with the temperature of incubation in some strains of *B. typhosus*, *B. paratyphosus* A, and other bacteria. For instance, all strains of *B. pseudotuberculosis rodentium*, a plague-like bacillus which

causes disease in guinea-pigs and rabbits and occasionally in man, are motile when the incubator is kept at 70° to 80° F., but when the cultures are kept at 95° to 98° F. they are no longer motile and often they do not form any flagella. This fact alone suggests that flagella do not play an important part in infection, since the body is never cool enough for them to develop readily in these strains, which may nevertheless be quite pathogenic.

Further, it is not very uncommon to obtain from the blood in typhoid fever only non-motile cultures. It is true that they usually become motile after being subcultured once or twice, but the motile character is evidently suppressed in the blood and tissues of these patients, and this assumption is made the more probable by finding that in some groups of cases the patient's serum when used for a Widal reaction fails to give the typical flocculent clumping of flagellar agglutination even when the emulsion used for the test is well endowed with flagella. This defect in the typical Widal reaction was found in 25 per cent. of the cases of typhoid examined by Felix in Palestine and in 75 per cent. of cases tested by Pijper in Johannesburg. Other workers in South Africa have had a similar experience. So frequently did Pijper find the Widal test fail that he ceased to attach much importance to it. It is now, however, realised, as the result of Felix's work, that the serum of such patients does still agglutinate the bodies of typhoid bacilli in a characteristic manner, though the serum contains no flagellar agglutinins. The somatic clumping is not so obvious and needs some hours incubation of the agglutination tubes before it is apparent. For this reason somatic agglutination has very often been missed and not taken into calculation in agglutination experiments.

Relation of the Somatic Antigen to Virulence.

Since the flagellar part of the bacteria appears to be of such little pathogenic importance it remains to consider the constituents of the bacterial bodies which can be detected and to some extent measured by serum reactions, especially by agglutination, which is probably a fair measure of the somatic antigens.

R. variant. Non-virulent.—In old laboratory cultures of *B. typhosus* and *B. dysenteriæ*, the specific smooth somatic agglutinable substance often becomes altered to that found in the R form so that it loses its specificity. These R bacteria then give less specific reactions and they agglutinate with sera made for the R form of other species of bacteria and have also lost their virulence. This "rough" change is promoted by growth in strong nutrient broth. In much more dilute broth—e.g., diluted with water four or five times—it keeps its S characteristics much longer. The replacement of S by R bacteria in old laboratory cultures in great part, if not altogether, accounts for their loss of virulence.

R variant produced by anti-"S" serum.—Not only are the R forms found in old laboratory cultures, but the S may be changed to the R antigen by more active means. If an S culture is grown in serum of an animal which has been immunised against the S form of the same bacillus, the S character gradually disappears from the culture and some, or all, of the bacteria become rough. At the same time the culture becomes non-virulent. This has been observed in part by several workers, Stryker, Walker, and others, and more definitely recently by Griffith, Reimann, Pitt, and myself. It is clear now that it is the actual antibody in the S anti-somatic serum which produces or accelerates this change, and that other antibodies do not have any effect. When the R somatic antigen has displaced the S, the S antiserum no longer has any somatic specific antibodies for such R bacteria. In spite of the lack of virulence of the R form it does not appear to lack vitality and vigour for vegetative growth.

Chemical Analysis.

It is in the attempt to solve the problem of the real difference between the S and R forms that the biochemist has stepped in and materially helped the concept of virulence.

Carbohydrate specific soluble substance.—The work of Heidelberger, Avery, Zinsser, and Landsteiner has introduced a new idea into the study of virulence. Their results are strongly supported on the theoretical side by Landsteiner's work on other kinds of substances which evoke antibodies in the blood of animals.

The virulent capsulated pneumococcus and the similar cultures of the capsulated so-called pneumobacillus of Friedländer when analysed chemically have been shown to contain a carbohydrate substance which is absent from the uncapsulated or "degraded" cultures which lack virulence. The capsule appears to consist largely of the carbohydrate or polysaccharide which has been called the "specific soluble substance," united with protein. It seems certain that this high development of the capsule is responsible for virulence and specificity and that the protein with which the carbohydrate is combined and which alone remains in the uncapsulated variety while sufficient for the life and growth of the microbe does not of itself determine high virulence. Not only is this the case, but the potent specific substances present in the blood of the immunised animal which counteract the effect of virulent cultures are not formed unless the carbohydrate or specific soluble substance is present in the immunising inoculum. This specific substance is not in itself, however, particularly toxic, nor does it evoke antibodies in the blood serum unless it is united with the protein substance which is always present, and which is apparently the most essential component of the bacterium as regards life and growth, apart from survival in the animal body and parasitism.

At first it looks as if the coincidence of capsule and virulence might be merely a restatement of the old observation that capsulated were more pathogenic than uncapsulated bacteria in certain species, and might be due to the old belief that the capsule protected the bacillus against phagocytosis by its physical interference with the process. There is, however, more in it than that, and there is a distinct advance in knowledge. Besides the satisfaction of having pushed the understanding of the matter back to the more intimate chemical structure, the capsule of different types of pneumococcus has been shown to be different chemically, and since the virulence of the types varies, so also the virulence may be said to vary with the chemical composition of the capsule. Type I. pneumococcus is much more virulent than type II., and the sugar obtained from it by analysis is different.

Moreover, there is very good reason to believe that a similar addition of a carbohydrate "specific soluble substance" to the protein of the bodies determines the difference in pathogenic activity and serological behaviour of the S and R variants of *B. typhosus* or *paratyphosus*, though in these bacteria there is no suggestion of a capsule being present.

Streptococci are a much more difficult problem, but they yield to chemical analysis essential differences in the composition of virulent and non-virulent cultures, and these have to some extent been correlated with the manner of growth, though in this group the superficial differences in the colonies are not quite the same, and still need further study before their significance is established. It seems as if the specific soluble carbohydrate substance comprised in the capsulated and S cultures was the essence of virulence and specificity which, as it were, gave a fillip to the bacteria and enabled them to cope with the conditions in the animal body.

A theoretical but not unimportant question is, how does the bacterium get this new substance? Is it merely due to a development and increase of an already existing part or function, or is it really an acquirement taken up whole and worked into its

organisation like food and perhaps derived direct from the susceptible animal, or does it arise by the reaction of the bacterium to the juices and cells of the host? Certain bacteria are well known to increase in virulence when grown in normal serum in vitro.

The idea of an actual acquirement by the microbe from outside seems crude at first sight, but seeing that the capsulated state of the pneumococcus is not as a rule permanent and is often rather fugitive on artificial media which do not contain animal products, such as serum, the persistence of the capsule for the limited number of generations during which it usually continues in artificial media might perhaps be due to purely passive inheritance. Griffith, in 1928, using what appear to have been ample controls, found that if a living uncapsulated non-virulent pneumococcus were injected subcutaneously into a mouse together with a large amount of an emulsion killed by heat of a virulent culture of capsulated pneumococcus, then the mouse might die with virulent capsulated pneumococci in the blood of the same type as that of the heated culture. Neufeld and Levinthal, in the latter part of the same year and Reimann more recently, have confirmed this observation in essential points. This suggests that the presence of the specific soluble substance from the heated capsules enabled the uncapsulated or degraded culture to acquire virulence for the mouse and capsulation by assimilating the material from its environment. This is a remarkable feat and if fully corroborated will mean a great advance in the theoretical position. It is *not* intended to maintain that no parasitism can occur without these or somewhat similar changes in the capsular or somatic composition, but in the case of the more virulent microbes which have been investigated this appears to be so.

Immunity and prophylaxis in relation to variants.—In a few instances in which experiments have been made and a definite answer obtained, not only does virulence appear to be dependent on chemical changes or on the presence of special chemical constituents, but also the production of specific antibodies and immunity by inoculation of the bacteria, whether dead or alive, appears to depend on the same factor. Vaccines which do not contain bacteria endowed with the specific soluble substance are neither actively pathogenic nor of much value for prophylaxis.

Correspondence of In-vivo and In-vitro Characters.

The thesis which I wish to support, therefore, is that there is often a correspondence in variants between in-vivo and in-vitro characters, and that capacity for parasitism can in certain cases be detected by examining the saprophytic characters. A virulent has often essential differences from a non-virulent which are recognisable apart from the animal body, and these differences are of a definite kind.

To take a concrete example, the *B. aertrycke* or *B. enteritidis* of food poisoning has so-called forms named in bacteriological jargon "smooth" and "rough" variants. These are distinguished usually in the following way: (1) By the R being agglutinable by salt solution and forming a deposit in broth culture with clear liquid above, whilst the S is not agglutinated by weak salt and in the broth culture is uniformly turbid. (2) By the smooth, shiny, round colonies of the S and the irregular, flattened, granular colonies of the R form. (3) By the production of different antibodies in animals by the two forms and their differential reactions with them. These serum reactions appear at present to be the most constant and serviceable in-vitro tests of the difference. (4) By chemical differences, on which the previous characters and especially the last appear to depend. This is probably the most fundamental character which has been discovered. (5) By the loss or gain of virulence. (6) There may be loss or gain of toxigenicity associated with the change in virulence, or toxigenicity may appear to be quite independent. (7) Associated with the last four characters, ability or inability to produce specific resistance in animals with dead vaccine, has certainly been demonstrated in some cases, and this property may be retained by the emulsions used as vaccines even after boiling or treatment with alcohol. (8) A further change or state associated to some extent with the foregoing is very prominent sometimes. Adaptation to a particular species of animal cannot be recognised in vitro, but as far as observation goes the R form is not capable of adaptation. In other words, a virulent adapted strain is always S.

It is fair, then, to claim that the study of virulence and all that it implies has made a definite step in advance in the last ten years by the convergence of pure bacteriology, epidemiology, and chemistry on the problem, and many new directions for future advance have been indicated and paths for investigation have been opened up.

THE USE OF A NEW QUINOLINE DERIVATIVE IN THE TREATMENT OF INFECTION.*

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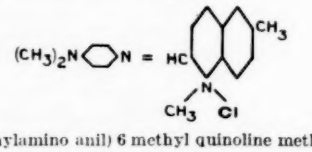
In a paper[1] published by Browning, Cohen, Ellingworth, and Gulbransen, in 1926, a number of derivatives of anil-quinoline were shown to possess strong antiseptic properties.

They represent a new group of compounds, not hitherto used as antiseptics. These substances are crystalline solids which display a characteristic green reflex, and form in water blue and violet solutions. Since, however, the substance is used in very high dilution, the stains of its solutions on linen are easily removed by ordinary washing processes. Owing to the instability of these compounds towards hydrochloric and other strong acids, they are unsuitable for administration by the mouth, unless special provision is made for protecting them in their passage through the stomach.

The member of the group selected for these experiments was No. 48 of the series described in the paper and has the following formula:—



2 (*p*-Dimethylamino anil) 6 methyl quinoline methochloride.

It may be mentioned that two other substances (Nos. 52 and 59 of the series) were first selected for preliminary tests, but their almost complete insolubility in normal saline was a serious drawback.

* The work reported in this communication was done with the support of the Medical Research Council.

[1] Proc. Roy. Soc., B., 1926, c., 293.

Although slightly less powerful in antiseptic action than these compounds, No. 48 is much more soluble in normal saline. With the object of further increasing the solubility of the substance, an attempt was made to prepare a sulphonated derivative. This product, subsequently referred to as "48 S," [2] although not the desired sulphonated compound, nevertheless proved on comparison with 48 to be superior in antiseptic power and to possess lower toxicity. The nature of the difference between 48 and 48 S is not at present known.

Antiseptic Tests.

Various amounts of a 0·02 per cent. (1 in 5000) solution of 48 S in normal saline were added to tubes of 1 per cent. peptone water and 20 per cent. serum-peptone water to give a series of concentrations from 1 in 50,000 to 1 in 1,000,000. These were inoculated with a loopful from a light emulsion of *Staphylococcus aureus* and *B. coli*. The tubes were incubated for 18 hours and subcultured on to agar plates. From the results of a number of tests the following figures represent a fair average for the minimum concentrations which effected complete sterilisation.

Anil-quinoline 48 S.

1 per cent. peptone water.		20 per cent. serum-peptone water.	
S. aureus.	*B. coli.*	*S. aureus.*	*B. coli.*
1/500,000	1/350,000	1/400,000	1/300,000

For comparison, simultaneous tests were made with acriflavine, which is a recognised efficient antiseptic in common use.

Acriflavine.

1 per cent. peptone water.		20 per cent. serum-peptone water.	
S. aureus.	*B. coli.*	*S. aureus.*	*B. coli.*
1/200,000	1/100,000	1/200,000	1/100,000

It will be seen from the above figures for 48 S that the potency is only slightly diminished by the addition of serum, in agreement with the observations previously recorded by Browning and his co-workers with respect to this group of substances.

With regard to the figures for acriflavine, although too great weight need not be attached to the differences in the values obtained (compare Browning and Gulbransen,[3] 1921), the comparison indicates that 48 S is more potent than acriflavine, and encouraged us to proceed with clinical tests.

Toxicity Tests.

The toxicity of 48 S was tested on rabbits by intravenous injection of a 0·5 per cent. (1 in 200) solution in normal saline, this forming an exacting test of the toxic action of the substance. Consideration of an extensive series of tests (75 rabbits) showed the mean dose tolerated by a 4½ lb. rabbit to be in the neighbourhood of 9 c.cm., equivalent in drug content to 45 c.cm. of the strongest solution later used intravenously in clinical practice. It will be seen, therefore, from the figures quoted later, that the clinical administration of the substance was far within the probable limit of tolerance for man.

Clinical Tests.

In view of the comparatively high antiseptic power and the relatively low toxicity of 48 S, it was decided, with the sanction of Prof. Dobson and the members of the honorary staff of the General Infirmary at Leeds, to test this compound in the treatment of all varieties of both local and general infective conditions. Its use at the above hospital has been extensive during the past 18 months.

Whilst it is impossible to give a detailed report of the in-patients (exceeding 1000 in number) treated with 48 S, or of a considerably larger number of out-patients, an attempt will be made to classify the cases treated according to the method of usage of the antiseptic, to state results, and to give a comparative impression of the value of 48 S. In certain sections, typical and instructive cases will be quoted.

It must be remembered how exceedingly difficult it is to assess the value of an antiseptic. There is no satisfactory bacteriological test; we have tried the method of taking swabs, growing cultures at intervals, and counting the number of colonies per unit field; but there are many fallacies and drawbacks in this method. Practically speaking, the only method is to judge the antiseptic on the clinical results obtained, and to compare the results with those obtained when using other antiseptics. Principally we have relied on this method. It has been advantageous, because the expenditure of a long period of time has been necessary, which is essential if a thorough clinical test of any antiseptic is to be made.

Groups of Cases in which 48 S has been Used.

A. It has been used as a prophylactic *antiseptic dressing* or *pack* in the treatment of: (1) Potentially infected accidental wounds and abrasions, as met with in the casualty department. (2) Extensive laceration of soft tissues, either alone or associated with fracture, requiring a thorough toilet of the wounds under general anæsthesia. (3) Circumcisions, amputation stumps, skin grafts. (4) The post-rectal space after operation for prolapse or excision of the rectum or after interstitial irradiation of cancer of the rectum with radium.

B. As a *local application* and *pack* in the treatment of gross infections: (1) Acute infections of the skin and subcutaneous tissues—i.e., boils, carbuncles, and cellulitis. (2) Suppurative hæmatomata. (3) Acute suppurative bursitis. (4) Acute suppurative lymphadenitis. (5) Ischiorectal and perianal abscesses. (6) Infected abdominal wall wounds—e.g., after operation for acute perforated appendicitis. (7) Fungating growths.

C. As an *irrigant* in the treatment of acute infections of bones and joints, such as acute infective osteomyelitis and acute suppurative arthritis.

D. As an *irrigant* in the treatment of chronic long-standing infections, comprising chronic infective osteomyelitis of the lower jaw, chronic empyemata, and suppurating hydatid cyst of the liver, after marsupialisation.

E. As a *genito-urinary irrigant* in cases of: (1) Acute and chronic cystitis. (2) Suprapubic bladder washing after cystotomy for enlarged prostate, vesical calculus, ruptured bladder and urethra, or malignant papilloma of bladder treated by diathermy. (3) Wheelhouse and Symes's external urethrotomy. (4) Perineal section for extravasation of urine. (5) Nephrostomy for pyonephrosis.

F. *Intravenous administration* in cases of septicæmia with a positive blood culture.

Clinical Results.

The following is a brief résumé of the clinical results obtained in each of the above groups.

Group A.—The strength of solutions used varied from 0·05 per cent. to 0·1 per cent. (1 in 2000 to 1 in 1000) in normal saline solution. As a modification we have tested the antiseptic in hypertonic saline—i.e., 2–3 per cent.—but this possesses no obvious advantage over normal saline. We are of opinion that the results obtained in this class of case are satisfactory. They are particularly striking in the case of the extensively lacerated wounds which are so common as a result of machinery or motor accidents. Cases of severe mutilation of the limbs associated with bad comminuted fractures have given excellent results.

[2] It is suggested that this substance should be called "quinanil."

[3] Brit. Jour. Exp. Path., 1921, ii., 95.

The antiseptic is a bland, non-irritant one, and can be used in abundance without any tissue damage or irritation. Its use can be prolonged: the granulation tissue which forms is firm, not swollen or œdematous, of the healthiest colour, and not protuberant.

Group B.—Here again the results have been satisfactory. In such cases as deep abscess cavities—e.g., ischiorectal—where it has been essential to pack the cavity most carefully and over a long period of time in order to ensure healing from the depth of the wound, there has been no indication of tissue damage or irritation. Epithelialisation from the edges of the wound is encouraged.

Group C.—In the case of acute infections of bones and joints, 48 S has received a thorough clinical test. The strength of solution used has varied, depending upon age and type of infection, from 0·01 per cent. to 0·1 per cent. (1 in 10,000 to 1 in 1000) in normal saline solution. The method of application has been by intermittent flushing of the wound, always keeping it moist by the aid of Carrel tubes. It is our opinion that in these cases the infection is more quickly brought under control, the separation of the sequestrum occurs more readily, and consequently the healing process is more rapid than has been our experience with other antiseptics generally employed in the treatment of these conditions. In uncomplicated cases, within 14 days of the original gutter operation for the drainage of the medullary cavity of the bone, the wound presents a firm, reddish pink, healthy granulating surface extending into the depths of the bone, and interrupted only by the yellow edges of the sequestrum in the process of separation.

One case of acute suppurative arthritis of the hip-joint is worthy of mention:—

The patient, aged 16 years, was admitted under the care of Mr. Dobson, complaining of excruciating pain in the left hip-joint of six weeks' standing. She was profoundly ill on admission, with temperature 103° F., respirations 28, and pulse 120. Examination revealed the fact that there was an acute suppurative arthritis, together with pathological dislocation of the left hip-joint. Exploratory arthrotomy was performed by one of us (G. A.). The head of the bone was excised and the joint drained. Continuous irrigation with 0·1 per cent. (1 in 1000) 48 S in normal saline solution was carried out. Immediately after operation the patient was profoundly ill, but apparently suffered no toxic effects from the large amounts of 48 S used.

To-day, ten months after her discharge from hospital, the wound is perfectly healed, and walking is almost devoid of limp. Examination of the joint reveals complete bony ankylosis in a position of 30° flexion and 30° abduction. X ray examination confirms the clinical findings.

Group D.—In this type of subacute and chronic infections the results are quite naturally not so striking as in the former classes, but nevertheless these cases have done well. The same strengths of solution in normal saline have been employed. In some cases 48 S has been used solely; in others its use has followed upon previous treatment with other antiseptics.

Group E.—As a genito-urinary antiseptic much weaker concentrations have been employed—namely, 0·005 per cent. to 0·05 per cent. (1 in 20,000 to 1 in 2000) in normal saline. The results have been encouraging. It should be remembered that the antiseptic is precipitated by concentration of salts such as are met with in normal urine, and in order to avoid this preliminary washing out with normal saline and boric lotion is carried out. Cases of bad cystitis in association with gonorrhœal and traumatic strictures of the urethra, enlargement of the prostate, and malignant papilloma of the bladder have responded satisfactorily.

A man, aged 58, was admitted to hospital under the care of Mr. Dobson, suffering from an extensive malignant papilloma of the bladder, associated with a stinking cystitis. Mr. Dobson performed a suprapubic cystotomy and found it impossible to proceed further on account of the cystitis. Suprapubic irrigation of the bladder with 0·05 per cent. (1 in 2000) 48 S in normal saline reduced the degree of cystitis in a remarkable manner within ten days.

Another man, aged 36, was admitted to hospital under the care of Mr. Dobson, suffering from rupture of the urethra in association with a fractured pelvis. Operation was immediately performed by one of us (G. A.). Perineal section was performed, but it was impossible to repair the tear in the urethra without preliminary suprapubic cystotomy and retrograde catheterisation. Eventually repair of the urethra was accomplished, and all the wounds left open. Irrigation of the bladder with 0·05 per cent. (1 in 2000) 48 S in normal saline was carried out during the patient's stay in hospital of ten weeks. To-day, eight months after operation, the patient is perfectly well, with no trace of cystitis.

Group F.—The nine cases of septicæmia treated by intravenous injection are as follows:—

(1) Six cases of acute infective endocarditis. No successes have been obtained. All the cases treated had a positive blood culture (streptococcus) and were all well advanced when they came under treatment. The initial intravenous dose was 20 c.cm. of 0·1 per cent. (1 in 1000) 48 S in normal saline solution, and this was repeated daily, increasing by 5 c.cm. on alternate days up to as much as 50 c.cm. Although all the cases proved fatal, it is significant to note that the temperature dropped after energetic administration of 48 S, and no toxic effects were manifested.

(2) One case of pneumococcal septicæmia and one case of staphylococcal septicæmia with bronchopneumonia. Both these cases terminated fatally.

(3) One case of streptococcal septicæmia with a positive blood culture, which recovered. This patient was under the care of Dr. J. le F. C. Burrow, to whom we are indebted for permission to publish the case.

The patient, a male aged 20, commenced his illness suddenly with a rigor. He continued for more than a week with severe backache and pains in the legs, high temperature, and shivering attacks. On admission to the hospital he was extremely ill, pulse 130, respirations 24, temperature 102°, pale, sweating, and semi-delirious. He made much complaint of pain in the legs, and especially in the region of the right hip, such that an acute arthritis of this joint was suspected. There were enlarged and tender inguinal glands, and an examination of the foot revealed a septic heel. A blood culture taken on the day of admission revealed the presence of a hæmolytic streptococcus.

It was decided to institute a vigorous course of intravenous antiseptic treatment, using a 0·1 per cent. (1 in 1000) solution of 48 S in normal saline. 20 c.cm. were administered at once, and on succeeding days for three days, when the dose was increased to 30 c.cm. and given for six days. Thus in ten days the patient received 260 c.cm. During this period the temperature was remitting daily between 103·5° and 100°. It then continued to intermit, gradually falling, however. On the tenth day after admission the temperature was normal, with an evening rise to 99·5°. Intravenous treatment was then stopped. Meanwhile the heel was incised, and a quantity of pus obtained. A large abscess of the right buttock appeared, and was drained on the tenth day after admission. A blood culture taken the next day was sterile. The patient's general condition was greatly improved, and the pulse was normal. His convalescence was uninterrupted for a fortnight, when he had a 48-hour pyrexial bout due to nasopharyngeal infection. A third blood culture taken immediately after this was also sterile. He was discharged after a short convalescence cured, and remains perfectly well to-day nine months afterwards.

Whilst we cannot attach great importance to the value of one particular case, we deem the above worthy of record.

Summary.

"48 S" is a slight modification of an antiseptic previously described by Browning and co-workers. The action of this antiseptic is only slightly diminished by the presence of serum, and the substance has a relatively high antiseptic titre, together with a low toxicity. The above clinical results indicate that 48 S is an antiseptic which is valuable in the treatment of all classes of surgical infections.

Addendum by Prof. Dobson.

Nothing is more difficult than to estimate the value of an antiseptic either in the prevention or in the treatment of septic processes. So far no scientific method has established itself as of value in such estimation, and one is left to depend entirely on personal opinion. Too often such opinions are valueless, being the outpourings of undiscerning

enthusiasts. No surgeon who can recollect during the war the recurring waves of enthusiasm which greeted the advent of the latest antiseptic from "strong mixture" to plain soap can remain other than sceptical about another new remedy. But the search still continues for an antiseptic which, when applied in time, will prevent the development of sepsis and, when this process is established, will control and subjugate it. It cannot be maintained that this substance, 48 S, is such an antiseptic. Yet in my opinion it possesses qualities superior to those of any other similar substance of which I have experience. It is worthy of an extended trial, which I hope it will receive.

THE VALUE OF BISMUTH IN THE TREATMENT OF SYPHILIS.

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AND

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Before bismuth was definitely introduced for the treatment of syphilis in 1920 by the French workers, Levaditi and Sazerac, organised research had already been undertaken in Germany with a view to the use of this substance in the treatment of spirillas and related infections. These investigations, however, did not lead far because of the high toxicity of the preparations or compounds. As early as 1908 Uhlenhuth in the Imperial Hygienic Institutes treated trypanosome infestations with bismuth combined with arsenic. With the same end in view Ehrlich and Karrer in 1913 made a preparation of bismuth and arsenobenzol which unfortunately proved very unstable and therefore could not be used in practice. Not until 1919 did German writers publish a communication dealing with investigations on bismuth; in that year Kolle and Ritz used intravenous injections of colloidal bismuth in the treatment of syphilis in rabbits. This substance, however, proved extremely toxic and the investigations were therefore discontinued.

The studies of bismuth, begun in 1916 by Sauton and continued by Levaditi and Sazerac, who published their results in 1920, were first investigated in Germany in 1922 by Hugo Müller, who used the original French preparations. In the same year the first German antisyphilitic bismuth preparation was produced in Hamburg by the chemical firm of Tosse. This was "Bismogenol," and it was at once introduced into therapeutics by Deselaers. Other preparations of bismuth followed and were extensively investigated from the clinical side, and a large number were found to be active. A recent review by Hugo Müller and Kohlenberger shows that there are now about 17 German preparations of bismuth for the treatment of syphilis. Erich Hoffmann is justified in describing this state of affairs as harmful.

After six years of clinical observation and therapeutic administration we give our general conclusions on the value of bismuth treatment. There can be no doubt that the introduction of this metal represents a definite step forward in the treatment of syphilis, and the views of the few observers who contest this point (de Stefani, Villarejo, Bonnamour-Delore) do not essentially alter our opinion. Hugo Müller, to whom we owe an excellent summary on the technique of bismuth treatment, justly remarks that the various authorities who have made comparative studies of the therapeutic value of bismuth, salvarsan, and mercury have started from different standpoints. Some laid more stress on the rapid disappearance of the spirochætes when there were manifest symptoms and bismuth was the only treatment employed. Others attached more importance to the change in the reaction of the serum, or to the clinical progress, or to the rapidity of the disappearance of the obvious symptoms. Further, it must be remembered that different investigators used different preparations of bismuth of very varied composition, a fact which will certainly account for differences in the final verdicts. Lomholt states that different bismuth compounds are absorbed at very varying rates. This author has made an excellent contribution to the question of the chemical action and the fate of bismuth in the body, and in his most recent summary (1928) remarks upon the defective knowledge and erroneous ideas which exist on this subject. As the rate of absorption varies it follows that the effect must vary. "The decisive factor for the potency of action is the amount of bismuth metal which they contain and the rapidity with which they are taken up from the site of their deposit and pass into the body." The amount of bismuth varies extraordinarily—according to Langer as much as 20–100 per cent.—in the different preparations and also varies in different batches of the same preparation (Grumach, Engelhardt). The rapidity of absorption depends considerably on the method of application, on the solvent or suspension medium, and on the concentration and the size of the particles.

There is an extensive literature on the pharmacological, toxicological, and chemotherapeutic aspects of bismuth, especially in the treatment of syphilis, and it would lead too far to go into the details here. Engelhardt has recently published for the first time the results of researches, with methods to which no objection could be taken, on the excretion of bismuth from the human organism, with special reference to the significance of the various preparations and various methods of their use in the treatment of syphilis. This work calls for special attention.

Intramuscular Injection of Bismuth.

At the present time the method most generally adopted in Germany is the intramuscular injection of insoluble salts. Intravenous injection (Nadisan solubile, Nadisan colloidale, Sigmuth, Salluen, Wismulen, Bismuto-Yatren, Solvitren, &c.) has been practically abandoned, despite certain good reports (Memmesheimer, de Medina), primarily because of the great danger of shock and acute yellow atrophy of the liver, but also because the effect is in some respects weaker—e.g., on the serum reaction (Müller and Kohlenberger, Pautrier and Benech). In October, 1926, Hugo Müller sent a circular letter to German institutions where bismuth preparations were most in use, and he reports that over one-half of all the clinics employ the first German bismuth preparation—i.e., Bismogenol. We have used this preparation in our own clinic for the last six years, although we have also employed others. Our conclusions on its value for antisyphilitic treatment are based upon a relatively large number of clinical cases kept under observation for a comparatively long time.

Bismogenol is a suspension of a bismuth compound of a highly valent oxybenzoic acid in olive oil; it is thus a salicylate derivative, possibly identical with bismuth salicylate. Its content of bismuth is 59–60 per cent. or 0·05–0·06 g. per c.cm. Engelhardt has discussed the absorption of the preparation and has shown that Bismogenol is "the one bismuth preparation which is absorbed with the rapidity required." He further observed as a remarkable fact that Bismogenol is followed by a diuretic action which is not noted to such an extent after other bismuth preparations (a daily diuresis of 4–5 litres during the first ten days of treatment). There is a considerable literature on Bismogenol, including work by investigators from other countries as well as Germany. One great and indispensable therapeutic fact that emerges from all this work is that Bismogenol is, in the widest sense, an innocuous preparation. This is clearly shown by a case in this clinic which has been described by Prater.

A patient had two injections of 10 c.cm. of Bismogenol at an interval of three days, the usual dose being 1 c.cm. As a result of this enormous overdose the patient had a mild stomatitis and a slight trace of albumin appeared in the urine, but there were no local signs of irritation. Six weeks

after the two injections a skiagram failed to reveal any deposit of bismuth.

Bismogenol is not subject to bacterial contamination, even if the vessel containing it is exposed to the air. Deselaers and Kafka have shown that Bismogenol remains sterile under these conditions, and we have been able to confirm their observation.

Experiences with Bismogenol.

Two reports have been issued from this clinic at the conclusion of a large series of investigations on the therapeutic effect of this preparation. One of us (Ritter) described his experiences one year after the introduction of Bismogenol, when he stated that the method of treatment with it showed remarkably good progress. There was not one failure in six cases of primary syphilis with a negative Wassermann. The reaction remained negative after the healing of the clinical signs. In other words, this preparation acted as an abortive agent on the disease. The effect of the exclusive use of bismuth in secondary and tertiary syphilis was good, the effect on the serum reaction being particularly noteworthy. In a work which appeared two years later Lauterbach was able to confirm Ritter's observations on the basis of a much greater clinical material. He also had at his disposal a series of patients who were treated by Bismogenol exclusively with excellent results. It is noteworthy that one patient who was treated for secondary syphilis with bismuth subsequently acquired a reinfection. Lauterbach also mentions especially the good effect on the Wassermann reaction (W.R.).

After six years' experience with this preparation our opinion of it has undergone no modification. Unpleasant effects have hardly ever been encountered, especially not the "embolia cutis medicamentosa" (exanthematica, bullosa, gangrænosa) described by Freudenthal, Nicolau, and Nagel. Freudenthal, who described it first, designated it as a "local embolic Bismogenol-exanthem," but it has not been observed in the many thousands of injections undertaken during the course of a year. Other skin eruptions have been described by authors such as Buy, Wenniger, Grön, Müller, Hudelo, and Ravaut) after the administration of other bismuth preparations as well as after Bismogenol (Kerl), but we have not observed any of them. There is, however, one exception in a patient who is still in the clinic and whose case should be described on account of certain important points.

A female patient, aged 19 years, suffering from obvious syphilitic signs (papules, spirochæte-positive) had received an intramuscular injection before admission. The nature of the preparation could not be ascertained. Otherwise there had been no treatment. On admission the W.R. was strongly positive. An intramuscular injection of 1 c.cm. of Bismogenol was given. The next day the patient had a high temperature and a generalised dermatitis of a scarlatiniform type, of the characters with which we have been familiarised by Jähnke and Schäcker and Pawlas. Venesection was performed and Ringer's solution was infused, and in a few days the manifestations subsided, but the rash returned after eight days in a milder form, although the patient had no more Bismogenol. After this relapse had disappeared 1 c.cm. of Bismogenol was given again, whereupon the temperature rose once more and there was a repetition of the rash. There was a very strongly positive intramuscular reaction with 0·1 c.cm. of Bismogenol, and a pad soaked in Bismogenol could not be kept on the skin of the forearm for longer than ten minutes because of the intolerable burning and blistering. Thus there was in this case an intense hypersensitiveness to Bismogenol. The behaviour of the skin to other preparations of bismuth has not so far been tested. The patient tolerates salvarsan exceedingly well. After the subsidence of the second outbreak of the rash the W.R. was completely negative, and the syphilitic manifestations were completely cured.

This case provides one of the best proofs of Ritter's contention of the importance of toxic exanthemata as non-specific curative factors in syphilis.

By-effects were seldom seen. That most frequently observed was a bismuth line, more especially in patients who had the bismuth at the conclusion of a malarial treatment—in other words, patients who were particularly liable to absorb the drug in large amounts. The line, however, was invariably slight. A fully developed stomatitis was seen very rarely, but we always insist upon a very thorough hygiene of the mouth during an antisyphilitic treatment. We have never seen any disturbance of the intestinal tract nor any derangement of the nervous system, and damage to the kidneys was also very rare. In no case was there any permanent injury; at most some epithelial cells could be found in the urine, but without albumin. Naturally, the urine must be most carefully examined during a bismuth treatment. None of the patients ever complained of pain at the site of the injections, which were never objected to, even by the most sensitive patients.

The Relationship of Bismuth to Salvarsan and Mercury.

As with every new form there were at first some optimists who wished to place bismuth on a higher plane than salvarsan in the treatment of syphilis. Ritter uttered a warning against this in his first work, and the experience of the following year, based upon comparative researches, showed that he was correct. Lomholt laid great stress on the far-reaching pharmacological and toxicological similarity of bismuth and mercury. From a therapeutic standpoint both metals produce a rapid saturation of the body with a large amount of the metal which, however, is well borne. The saturation persists for a very considerable time, Owing to this similarity Lomholt is of opinion that bismuth may replace mercury in the treatment of syphilis, because the by-effects of the latter drug are much more severe, but that bismuth can never replace salvarsan. Hugo Müller, on the other hand, states that bismuth appears to be superior to mercury—apart from grey oil and calomel—but that otherwise it is not correct to speak of a complete substitution of mercury by bismuth. Bismuth cannot be regarded as irreplaceable in the sense that salvarsan is, because the latter holds a unique position in the campaign against syphilis as a human plague.

Naturally, different views on this matter are more or less subjective and are not capable of proof. Our own opinion, based upon experience, is that bismuth is definitely superior to mercury. Since using bismuth in our clinic we have not once given an injection of mercury. The question of inunction treatment is, however, not under consideration here, and we are also of opinion that the substitution of bismuth for salvarsan does not come under discussion. Each of these drugs has its own definite indication which mainly follows the natural course of the disease. To a certain extent the two drugs coincide at a certain point, and then they should be given in combination, for one of the most important advances in the modern treatment of syphilis appears to be the realisation that each case must be treated individually and any scheme should only be adhered to loosely. In choosing the form of treatment we must reckon to a very great extent on the coöperation of the powers of immunity possessed by the body, and we must be most careful not to disturb the state of immunity which is the resultant of the play of infection and defence. Our opinion agrees with that of other authors (Buschke, Langer, Nonne) that bismuth is well adapted for this purpose.

It was mentioned above that, at first, cases of primary chancre with a sero-negative reaction were treated with Bismogenol in an abortive manner, and that as a matter of fact permanent cure was attained. This method was at that time applied exclusively for the purpose of testing the Bismogenol, but it should not be adopted in practice. In this type of case salvarsan is absolutely indicated and should be used in combination with bismuth as an abortive treatment. Salvarsan will remove the actual state of infectivity with the maximum rapidity; its sudden powerful action may prevent the infection of the entire body. By means of the bismuth a long persistent effect over a certain period is assured, and this acts as a prophylactic against relapses. The further the syphilis extends the stronger is the indication for bismuth in its treatment. Although some authorities advocate

abortive treatment by means of salvarsan alone, and some indeed assert that combination with other remedies weakens the effect of the salvarsan (Stühmer, Fantl), the great majority take their stand on the combined treatment of secondary syphilis. Gougerot goes even farther when he says "after the first year salvarsan treatment is no longer imperative." The longer the syphilis persists the less becomes the necessity for salvarsan and the greater the indication for bismuth. The whole tendency of the schemes of treatments inclines towards the latter, and in further combination treatment iodine takes the place of salvarsan. The only exception to this is in cases where the cerebro-spinal fluid is positive in the stage of late latency, when a combined malarial treatment should be undertaken. At the conclusion of the malarial course a further course, in the form of an abortive treatment, should be given.

The very great value of bismuth, especially for the treatment of the later stages of syphilis, is undoubtedly due to some extent to the fact that it is a mild and yet durable remedy which serves as a preparation for more intense courses of treatment. It is never followed by the severe reactions which are often seen in the later stages after salvarsan. Bismuth is never contra-indicated at the beginning of an antisyphilitic course, with the one exception of early abortive treatment, whereas there are many contra-indications to salvarsan in the later stages. On the other hand, bismuth is indispensable in those cases which are hypersensitive towards salvarsan or mercury.

A Scheme of Treatment.

In the course of years a definite scheme of treatment has been worked out; it is tabulated herewith. No attempt will be made to compare this scheme with the many others which have been published from different clinics, but one point should be emphasised in the words of Jadassohn, "it is certainly not desirable to adhere slavishly to a scheme, which is by no means unnecessary in syphilis . . . but every scheme affords the opportunity of individualising."

We have adopted the following as divisions of the different stages of syphilis.

1. *Incubation Period.*—Three to five weeks. Variations from six days to six weeks.
2. *Primary Syphilis.*—Stage of primary chancre.
3. *First to Second Stage of Syphilis.*—As primary stage; but there is a positive Wassermann reaction without any clinical signs of generalisation.
4. *Secondary Syphilis.*—Manifest clinical signs of generalisation; spirochætes present; Wassermann reaction positive. In rare cases both these signs may be negative. Duration of secondary period generally four years, chiefly depending upon the state of immunity.
5. *Tertiary Syphilis.*—Manifest clinical symptoms coming on after the secondary period with positive Wassermann reaction. The presence of spirochætes is exceptional, and their absence the rule.
6. *Latent Syphilis.*—A general term for stages wherein the syphilis only manifests itself by a positive serum reaction, but no definite clinical signs are present. Its subdivisions are: (*a*) Early latency: three to five years after infection. (*b*) Late latency: after three to five years subsequent to infection.

The fundamental condition of treatment must be accurate diagnosis—i.e., the demonstration of spirochætes or of a positive Wassermann reaction after the exclusion of other causes. Observation may in itself be treatment.

(A) *Incubation Period.*—Observation.

(B) *Primary Syphilis.*—Administration of large doses of salvarsan in three courses as soon as the diagnosis has been verified. First day: 0·45 g. neosalvarsan. Second day: 2 c.cm. Bismogenol. Third day, 0·45 g. neosalvarsan. Fourth day: 0·45 g. neosalvarsan. Fifth day: 2 c.cm. Bismogenol. Sixth day: 0·6 g. neosalvarsan. Seventh day: 2 c.cm. Bismogenol. Eighth day: 0·6 g. neosalvarsan.

This is to be followed every four or five days by 0·6 g. of neosalvarsan and 2 c.cm. of Bismogenol twice weekly.

Total amount of salvarsan	5–5·5 g.
„ „ Bismogenol	20 c.cm.

Twenty-four hours after the first injection a W.R. test must be done and repeated every eight days during the treatment and 14 days after its termination.

Second Course of Treatment (30 days later).—First day: 2 c.cm. Bismogenol. Second day: Interval. Third day: 2 c.cm. Bismogenol. Fourth day: 0·45 g. neosalvarsan.

Then two injections of 0·45 g. neosalvarsan in the week and two injections of 2 c.cm. Bismogenol. In the following week two injections of 0·6 g. of neosalvarsan and of Bismogenol. Total amount as in first course of treatment. W.R. test as in first course and then at the end of the treatment and subsequently every month.

Third Course of Treatment (90 days later, last course).—The scheme is as in previous course; the W.R. tests included. If the reaction is negative no further treatment is given. Observation for possible later internal manifestations.

First to Second Stage.—Treatment as in secondary syphilis.

(C) *Secondary Syphilis.*—The treatment must avoid the production of a severe Jarisch-Herxheimer reaction on the one hand and of inadequate treatment and waste of effort on the other.

First Course.—Same scheme as second course of primary syphilis, with Wassermann test at the end of the course. Potassium iodide should be given in the interval until the second course begins.

Second Course (30 days later).—Identical with the first course.

Third Course (90 days later).—Similar to the other courses.

If the reaction remains negative after the first course no further treatment is required after the third course; but monthly tests should be made at first, and later on quarterly and half yearly. The cerebro-spinal fluid should be examined after three to five years. If this is positive treatment should be given as for latent syphilis. If, on the other hand, there are variations in the reaction during the subsequent courses further treatment will be required until the Wassermann reaction remains negative, and then two more courses should be given subsequently.

(D) *Tertiary Syphilis.*—It may be accepted as a principle that the skin, by the production of tertiary syphilitic manifestations, indicates that it has attained a very intensive degree of allergic sensitiveness and that the case in question is especially characterised by a great esophylactic action.

(*a*) *Simple skin cases*, without complications in the heart, vessels, bones, and especially in the cerebro-spinal fluid, can be relieved by Bismogenol injections, oral administration of potassium iodide, Zuttman's solution, and general tonics. Careful observations of internal organs and central nervous system is necessary; if these are healthy prolonged iodide administration should be given after the disappearance of skin symptoms, but observation must be continued. The Wassermann reaction must under no circumstances be forced to become negative.

(*b*) *Skin Cases Combined with Diseases of Internal Organs.*—The principle should be that of individual treatment of each case with reference to age and general condition. Long treatment with potassium iodide, inunction, and bismuth should be tried before resorting to salvarsan, in order to avoid the dangers of the latter. In detail:—

(1) *Heart and Blood-vessels.*—In addition to Bismogenol and potassium iodide a subsequent course of neosalvarsan is given in small individual doses (0·15–0·3 g. per dose), until a total quantity of 5 g. has been given, according to the amount of toleration, and repeated as in secondary syphilis.

(2) *Kidneys.*—Bismogenol and mercury, potassium iodide, and neosalvarsan are given with general care.

(3) *Liver.*—Salvarsan, potassium iodide, Bismogenol, and dietetic treatment are given, together with general care.

(*c*) *Skin Cases Combined with Disease of the Cerebro-spinal Fluid.*—Combined malarial treatment (compare work of Ritter-Völker). Contra-indications: Simultaneous presence of a renal or hepatic disorder; this must be dealt with first and then malarial treatment instituted. Simple syphilitic meso-aortitis is no contra-indication to malarial treatment.

(E) *Latent Syphilis.*—The examination of the cerebro-spinal fluid plays an essential rôle, especially in establishing the existence of a late latency, and also in treatment. A series of investigations has shown that:—

(*a*) In the stage of early latency the results of examination of the cerebro-spinal fluid are very varying.

(*b*) The cerebro-spinal fluid may become normal spontaneously if it has already been pathological.

(*c*) Energetic treatment is capable of making the fluid normal.

(*d*) As a rule the state of the cerebro-spinal fluid apparently remains constant for two to three years after infection (Meirowsky).

In the following scheme of treatment the term "well treated" signifies a method of treatment which corresponds to our directions for primary or secondary syphilis. "Insufficiently treated" signifies cases which have not undergone the courses prescribed by

our scheme, or cases which have had inadequate dosage or where the intervals between the injections have been too long.

(1) *Early Latency.—Positive W.R.* (*a*) Well treated; repetition of treatment as for secondary syphilis. If there is no change, malarial treatment (relative indication as a result of resistant serum reaction).

(*b*) Insufficiently treated: treatment as for secondary syphilis; otherwise procedure as in (*a*), when the Wassermann reaction remains positive.

Negative W.R.—(*a*) Well treated; no further treatment, careful clinical observation, and eventually examination of cerebro-spinal fluid at onset of late latency.

(*b*) Insufficiently treated: consider whether diagnosis of syphilis was correct; no treatment; procedure as in (*a*).

(2) *Late Latency.*—For every further decision in these cases it is necessary to obtain the result of the examination of the cerebro-spinal fluid.

Positive W.R.—(*a*) Well treated:—

(1) Positive W.R. in cerebro-spinal fluid: combined malarial treatment.

(2) Negative W.R. in cerebro-spinal fluid: Salvarsan treatment contra-indicated. Generally mild treatment with Bismogenol and potassium iodide is advisable, with careful observation and subsequent repetition of the lumbar puncture. Combined malarial treatment is given when there is a relative indication owing to resistant Wassermann test.

(*b*) Insufficiently treated.

(1) Positive W.R. in cerebro-spinal fluid: combined malarial treatment.

(2) Negative W.R. in cerebro-spinal fluid: very careful observation; procedure as in (*a*), subsection (2).

Negative W.R.—(*a*) Well treated.

(1) Cerebro-spinal fluid positive: after the exclusion of any possible error in this test malarial treatment (for which this is a most precise indication).

(2) Cerebro-spinal fluid negative: no treatment; careful observation.

(*b*) Insufficiently treated.

(1) Cerebro-spinal fluid positive: malarial treatment (most precise indication).

(2) Cerebro-spinal fluid negative: consider whether the diagnosis of syphilis was correct; no treatment; careful observation.

(G) *Congenital Syphilis.*—Treatment should only be given when the diagnosis of an existing syphilis has been absolutely established.

(1) Mother obviously syphilitic during pregnancy: good prophylactic treatment; careful clinical and serological observation of child without treatment.

(2) Mother with latent syphilis: no treatment during pregnancy or first discovery of syphilis in mother towards end of pregnancy, and no treatment in a prophylactic sense.

(*a*) Child clinically healthy: serological examination to be repeated often; treatment as for secondary syphilis if Wassermann reaction is positive; salvarsan, inunction treatment, and later Bismogenol.

(*b*) Child evidently syphilitic: treatment as for secondary syphilis (neosalvarsan 5–10 mg. per kilo body-weight, thus beginning with 0·02, later 0·03 g.–0·05 g.; subsequently inunction treatment, 0·5 g. each dose in four parts, then bath, interval of two days, repetition; about 30 rubbings and duration not more than five minutes. The ointment should be made to penetrate rather than be merely rubbed over. As an introduction to the treatment in pemphigus give sublimate baths (1 g. of corrosive sublimate dissolved in 100 c.cm. of absolute alcohol; 20 litres of water to be added to this mixture, at 35° C.; duration of bath 30 minutes). If there is any mercurial dermatitis the drug must be given internally thus:—

R Hydrarg. iodat. flav.	0·01
Pulv. gummos	0·5

Sig: One to three powders daily.

Careful observation must be made of the stools. The decision regarding the quantity of the drug which is to be administered must be based entirely on the constitution of the infant. As a rule there should be three courses of treatment in the first year, two courses in the second year, and one course in the third year.

3. Late congenital syphilis: as a rule treatment should be as in tertiary syphilis. When clinical signs have disappeared an examination must be made of the cerebro-spinal fluid.

(*a*) Negative Wassermann reaction:

(1) Cerebro-spinal fluid negative: no treatment.

(2) Cerebro-spinal fluid positive: malarial treatment, definite indication.

(*b*) Positive W.R.

(1) Cerebro-spinal fluid positive: malarial treatment, very strong indication.

(2) Cerebro-spinal fluid negative: no treatment, clinical observation, indication for malarial treatment relative.

This scheme offers a mode of treatment which is free from danger; but treatment must always be entirely conditioned by the state of the patient.

ELECTRICAL TREATMENTS IN ACUTE CONDITIONS.

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For many years electrical currents have been employed only in convalescent, or chronic conditions, and little or no thought has been given to the possible benefits they might bring to patients suffering from acute illnesses such as pneumonia, peritonitis, septicæmia, collapse, or shock.

This is very natural in view of the history of the development of electrotherapeutics. One of the earliest forms of electrical treatment was the "static machine." In this treatment the patient was near a big, unwieldy apparatus on an insulated glass-legged table, and was frequently the recipient of sparks and purposeful small shocks. With such a setting the mind does not even associate anything sedative, much less a sick room. Then came the so-called "Faradic currents," with their stimulation of muscle contractions, and the far more painful "Galvanic" contractions. Ionisations had their day, and were frequently carried to the point of toleration by the patient; even ultra-violet light, with its stinging erythema, and diathermy with its ability to coagulate and burn, all helped to make electrical treatment a process that required somewhat of robustness on the part of the patient.

It is, therefore, not in the least surprising that the possibilities of electrical currents in acute illnesses should have failed to receive recognition or support from those who had experience of its earlier and more common uses.

Since ultra-violet light has become more and more familiar to practitioners the interest in physical means of treatment has grown, and with this growth has come a realisation that, with suitable technique, this current can be so employed that it either can function as an intense counter-irritant or be so truly sedative that it is the treatment of choice for relieving pain in acute burns of the youngest babies. In America for some years Eaton Stewart at New Haven has been employing diathermy in all stages of pneumonia; and Crile at Cleveland has been using this current actually during and immediately after serious operations as a means of reducing operative and post-operative shock. Although I am not aware of any literature published in England on the subject of electrotherapeutics in acute ailments, it is clear that Eaton Stewart's pioneer work is beginning to bear fruit, for the medical wards of St. Bartholomew's are wired for diathermy, and, at the West Middlesex, diathermy in pneumonia is now practically a routine procedure.

In a paper I read at the School of Medicine for Women in 1926, my experience of diathermy in pneumonia was limited to six cases in all; one acute, in a child of 6, one unresolved pneumonia, and four broncho-pneumonias in patients varying from the age of 3 to 85. At that time, beyond having treated a somewhat similar number of burns with ultra-violet light, the only recent or acute conditions I had treated in large numbers were fractures and lymphangitis. The high percentage of these cases that received genuine relief and help have undoubtedly accounted for the rapid growth in the number of acute conditions that I have been called upon to

assist during the last two years, both in hospital and in private. Among these cases there are pneumonias of all kinds and descriptions, acute and spreading lymphangitis, peritonitis with temperature and profuse and offensive discharges, acutely septic joints and, last but not least, burns of all degrees.

Selection of Treatment.

In the primary selection of electrical treatment for any acute condition the first essential is to endeavour to visualise the actual pathological condition and the physiological response most desired; and then, with the knowledge of the physiological effects of various currents and current strengths, selection can be made without difficulty, and suitable technique employed with confidence. The simplest type of case to consider is the severe recent injury, and one case in particular comes to my mind.

The patient, a male adult railway worker, had had his pelvis crushed and fractured, and was suffering severe pain, and the region of the injury was greatly swollen and œdematous. The pathological condition here was, therefore, injured, and hypersensitive nerve-endings, muscle spasm and effusion each reacting adversely on the other.

The desired physiological response would therefore obviously be reduction of muscle spasm, of pain, and of swelling. Now the direct current has at its positive pole certain physiologically proved characteristics—namely, anelectrotonus, or the depression of sensitivity in nerve tissues; cataphoresis, or the carrying of water towards the cathode; and the removal of the demarcation currents of injury (Hermann) in muscle. This current, therefore, if exhibited with a technique that brings out these physiological attributes, is uniquely suited for such a case. And so it proved.

Large pads of gamgee wrung out in 1 per cent. zinc sulphate solution were placed over and near the pelvis, especially over the lower abdomen, which was the site of the greatest pain and swelling; an indifferent electrode was applied to a forearm, so that the current could flow in the direction of the lymph stream, and a current of two to four milliampères was utilised for 15 to 20 minutes. On this occasion the apparatus used was what is known as a galvanoset, but in bed cases the new portable direct current apparatus, known as the Medelect, is even more satisfactory. After the first treatment pain was so much relieved that some natural sleep could be obtained, and within two or three days pain and muscle spasm were gone and swelling rapidly diminishing. I have given technical details of this method elsewhere.[1]

Diathermy in Poliomyelitis.

Perhaps the next most simple condition to consider from the pathological point of view is an acute attack of poliomyelitis. Here we all have a vivid picture of an inflamed and congested area of the spinal cord, the inflammation leading to such congestion that the life of the anterior horn cells becomes precarious, many may die, and some recover with difficulty. To restore the normal physiological condition of the cord we would, if we could, at once reduce the congestion and allow circulation in arterioles, capillaries, and venules to carry out its ordinary work of nutrition. We know, however, that the affected parts are deeply placed in a bony canal, and that fomentations on the skin would have no chance of effective action. So we turn to the late Sir William Savory's great maxim, given in his famous lecture, when he came into the lecture theatre, looked at the students, said "Gentlemen, rest all inflamed parts," and for the remainder of the hour never uttered another word. There is not an authority on this ailment that does not lay down emphatically that electrical treatment in the acute stages must never be employed. When, however, we come to their recommendation for electrical treatment in the later stages, these are all of a "stimulative" nature, and the possibility of fomenting the spinal cord region has obviously never been considered. If the inflamed spinal cord lay within reach of fomentations, as does, for example, lymphangitis in an arm, fomentations would undoubtedly be added to the treatment of "rest." Can electricity provide a current free of any trace of stimulation of such a nature that it can, to some extent, act as a fomentation for so deeply placed and protected a structure as the spinal cord? The answer is, it can.

In diathermy, thanks to the work of d'Arsonval and others, it has been shown conclusively that, when current reversals occur at rates over 50–100,000 per second, all stimulation ceases. Now modern diathermy machines have current reversals from a half to three million times per second according to the way they are made; so even those with only 500,000 reversal have passed the stimulation range many times.

The diathermy current is closely allied to the wireless wave, and on passing through tissues they readily become degraded to heat waves, identical with the heat waves given out by a fomentation, a hot water bottle, or the water in an arm bath—with this difference, that their initial structure is such that they can pass through all kinds of tissues, whether conducting or non-conducting, and where they meet relatively poorly conducting tissues, such as bone, their change into heat waves is more rapid than in such vascular structures as muscles. It is therefore obvious that in diathermy we have a current capable of fomenting the neighbourhood of the injured spinal cord without any vestige of stimulation.

Although these facts have been emphasised, both in France and in England, the prejudice against using electrical treatment during the acute stage of poliomyelitis still remains—because electrical treatment calls up pictures of muscle contractions and stimulation admittedly to be avoided at all costs. In consequence of this very natural prejudice, I have only had experience of two cases during the really acute stages, and, with the known vagaries of this complaint, the mere fact that their pain disappeared rapidly and recovery was practically perfect does not, unfortunately, enable me to claim any specific benefit from the treatment. It is, however, justifiable to say that the clinical response corresponded with the theoretical considerations previously formulated. The technique would be simple and would consist of applying over the spine where the lesion is known to be a metal electrode, covered in two thicknesses of lint, wrung out in super-saturated saline solution. This electrode should be at least 6 in. to 9 in. square, and a similar electrode is placed over the soft parts of the abdomen. The actual size of the electrode should be determined by the area of the soft abdomen. A current of almost 1 ampère is passed for 20 minutes, and, if the pads are bandaged on with a thin rubber bandage, uniform contact will be secured, and the risk of burning be reduced to zero, as pads of these sizes, if carefully applied, will carry nearly twice this current, even in quite a young child, for considerable periods. One has, therefore, a large margin of safety.

Diathermy in Pneumonia.

Exactly the same pathological and physiological considerations arise in cases of pneumonia, bronchopneumonia, and allied conditions. I will not give clinical notes of the cases that I have treated with diathermy, since my experience of the benefits of this current entirely confirms the work of Eaton Stewart, and his book, "Diathermy with Special Reference to Pneumonia," is a sane and well-balanced treatise on the subject. The technique I employ for diathermy in pulmonary cases is precisely similar to the one just referred to, except that where patients are collapsed or suffering from difficult and hampered breathing the pads are slipped under each armpit, and the patient's elbows are held gently against the pads by nurse and doctor, so that the arm can follow respiratory movements without hindering them in the least. This method entails a minimum of disturbance of the patient.

One recent case of Dr. W. Byam's may be cited as illustrating several points in the application of diathermy in the early stages of pneumonia. In this patient, a man of 73,

[1] Brit. Med. Jour., 1924, i., 743.

with the sputum yielding a nearly pure culture of pneumococci and the lungs showing the early signs of consolidation, the chief anxieties were restlessness, continuous cough, and absence of any desire to sleep. During the first application the cough ceased, the patient fell asleep and had six hours' further restful sleep after the treatment ceased.

I wish to dwell at some length on certain effects of the diathermy current which are not, in my opinion, related to its action as a sedative fomentation. One of the first things that strikes the patient, the observing practitioner, and the technical expert is the restful after-effect, hours of quiet sleep often following the very first application. Another easily made clinical observation is a curious change in the type of respiration, which from being like an inverted V becomes definitely more smoothly undulatory in type. Also in delirious and wandering patients the delirium frequently ceases abruptly during treatment, and the patients converse intelligently.

Physiological Action of Diathermy.

Breathing that becomes deeper and more physiological in type, sleep or rest for periods far longer than could be accounted for by any single fomentation; an improved pulse volume—all these reactions are suggestive of some specific action of the diathermy current on the sympathetic system.

It has long been taught that diathermy acts only by heat, and has no specific action due to its wave-length. The very name of diathermy supports this theory. As I have said, however, diathermy currents are practically identical with ordinary wireless waves (one machine I have has a wave-length of 365 metres). This current, therefore, does not primarily belong to the heat, or infra-red, portion of the ether scale, but it does make itself manifest as heat *after* it has been absorbed, and to appear as such these waves must have first been absorbed and then changed to heat waves.

It is known that other parts of the ether scale such as radium, X rays, and ultra-violet light, have each their own peculiar specific effects, and it is reasonable to presume that diathermy, which only differs in the length of its waves, also has its own specific effects, even if these cannot be immediately recognised.

This being so, the question arises whether there are any clinical indications, other than those already given, that diathermy currents have any specific action, and, if so, on what particular structures do they exert this action.

Let us once more turn to poliomyelitis, but this time to the chronic case, with its cold blue atrophic lower limb. Give such a child diathermy from over the anatomical position of the injured cord to the abdomen three times a week (never at first to the affected limb), and at the end of 12 treatments the limb will be showing signs of increased warmth and improved trophic condition, not only during the actual treatment, but between treatments. What mere heat could do this?

Diathermy is recommended by Osler as the treatment of choice in hyperpiesia, but the effects obtained are not shown on the sphygmomanometer, but in the diminution of cramps, of head pains, giddiness, and indeed of those symptoms of sympathetic derangement of which the patient complains as the cause of his difference from normal health. In Crile's clinic in Cleveland diathermy is equally employed for cases of shock and collapse where the blood pressure is below normal.

For years I have been in the habit of giving abdominal diathermy to those cases of wasting debility associated with gastro-intestinal symptoms, and I use this current as a powerful aid to effective ultra-violet light treatment. If it be allowed that diathermy does have its own specific action, and that this action on the sympathetic system is of the nature of a "governor," there is nothing strange in finding it successfully employed, both in hyper- and hypopiesia, for are not the vaso-constrictor and vaso-dilator fibres themselves fibres of the same sympathetic system? With the acceptance of this theory of its action the observed effects on rest, breathing, &c., in pneumonia and allied conditions are understandable and logical, as are the effects of this current when employed in cases of shock, collapse, and affections of digestion.

It will, I think, be generally agreed that the pathology of shock and collapse is intimately associated with extreme derangement of the sympathetic mechanism. The physiological need is therefore restoration of tone and balance in this system. What is ordinarily done for the patient suffering from severe shock? Heat is applied in all kinds of ways, every effort and device that can be thought of to raise the blood pressure is resorted to; yet I have not heard of, or seen, except in the single case of Crile's clinic in Cleveland, diathermy being employed in shock and collapse if only as a supplier of heat. If my arguments in favour of this current having its own special field of activity carry conviction, what a sphere of research is opened!

A point that is often raised when discussing the advisability of utilising diathermy in serious conditions is that the application of the pads will disturb the patient. In employing diathermy, general metabolic saving can be effected without any disturbance of the patient if electrodes are either bandaged on to the sole of each foot, using the same technique as described above, or to each hand, forearm, or upper arm. It is clear that this method, especially when applied to the feet, constitutes practically no disturbance to the patient. It also obviates any risk of burning, for the portable machines are not capable of giving sufficient current when such a large resistance as leg to leg is in the circuit as will lead to burning, and firm bandaging, such as can be effected in these positions, is the best protection of all. For the last seven years in my department at the Royal Free Hospital infants with poliomyelitis have been treated not only without any trace of burn but with highly encouraging results.

Sepsis and Ultra-violet Light.

In the foregoing survey I have endeavoured to show the principles, pathological and physiological, that make me select either the direct current or diathermy, and I have said nothing about the treatment of septic conditions, such as peritonitis after operation, or other grave infections, such as septicæmia. Here ultra-violet light has a genuine field of usefulness. I have dealt elsewhere with its action in raising the hæmobactericidal power of the blood, but here I may perhaps refer to the possibilities of local treatment of septic cavities or sinuses, such as occur in peritonitis or osteomyelitis.

Provided there is adequate drainage, or, rather, adequate access, I have found that local ultra-violet light, by means of sterilised quartz rods attached to a water-cooled Kromayer lamp, act entirely locally and with a rapidity and effectiveness that suggests almost a special reaction under these conditions. It is easy to formulate reasons why there is no general reaction, even to intensive local treatments; for instance, it is possible to argue that the local reaction is on all fours with milk sterilisation by the mercury-vapour lamp, where thin films of bacteria-containing fluid are brought into close contact with the actual bactericidal rays of this current.

A case of necrosis of the lung provides an interesting illustrative case of this type. This patient, a child aged 6, under the care of Dr. Chodak Gregory, was almost in extremis, when doses of light from a mercury-vapour lamp, at 36 in. for three minutes, were applied to the huge offensive necrotic hole in the chest. From the first application there was a favourable local reaction which rapidly increased, and in a few days the patient was out of danger and made an uninterrupted recovery. In this case the treatment and the response were so obviously connected that the amelioration was clearly the work of the light on the local condition.

Burns.

There is one condition which I have left to the last, partly because it interests me acutely and partly because I can advance no theory that explains satisfactorily why the treatment I now invariably use is so uniformly successful in its results. The condition to which I refer is burns.

For these I employ extremely small doses of ultra-violet light from a full-sized mercury-vapour lamp at 30 in. for two minutes; the burnt surface being either covered with liquid paraffin or ambrine, the remainder of the limb being protected from the rays. The liquid paraffin or the ambrine are highly fluorescent in the presence of ultra-violet light, and therefore diminish the dosage materially, and change the incident ray to another which they give out. The second patient I ever treated by this method had third-degree burns of both breasts, and when doses of light were first administered was in a state of collapse from the repeated anæsthetics and/or pain of the dressings. From the first application of ultra-violet-light re-dressings were practically painless; recovery was uninterrupted, and the patient has since successfully suckled two babies at the breast.

An investigation of burns treated by this method is now proceeding, and I will content myself by recording the facts that pain is more rapidly alleviated by this treatment than by picric acid, tannic acid, liquid paraffin, or ambrine alone, and that healing is more rapid, and that the resulting scar is better. All this happens with a current which can readily cause erythema and desquamation of the epithelium. If the paraffin technique is not employed the pain and healthy formation of elastic epithelium is not helped. It seems to be essential, and the fluorescence of this material would appear to have something to do with the results. This question, and the question whether diathermy has a specific action on the sympathetic, must be left for future research.

Conclusion.

I will close with a plea and a warning. The plea is, that when electricity is to be used in acute illness it should not be asked to do the impossible by being called upon only when the patient is semi-moribund. The warning is, that practitioners should avoid employing persons not medically qualified for giving electric treatments in acute illness unless they have themselves mastered the technique. To emphasise the reality of this warning, I will mention a case recently brought to my notice where the spreading septic condition had been checked by competent and successful surgery, only to be thwarted by an injudicious dose of ultra-violet light, resulting in œdema, with consequent hindrance of the previously adequate drainage, and finally death.

It is therefore justifiable to claim that advances in our knowledge of electrical current now enable us to:

1. Eradicate, when so desired, all stimulative and irritative characteristics inherent in certain types of current.
2. Produce currents with true sedative effects.
3. That in consequence the direct current can now be used with benefit to reduce pain and spasm in recent fractures, &c.; diathermy employed in pneumonia, shock, collapse, &c.; and ultra-violet light in burns and septic conditions, with advantage to the patient.

SALFORD ROYAL HOSPITAL.—At the annual meeting it was stated that the number of patients treated during the year was 49,600. In order to provide the purchase-money for the premises recently acquired for the hospital extension, and to reduce the large bank overdraft, the board of management had been reluctantly compelled to sell hospital investments amounting to over £31,000. Plans have been approved for a paying patients' hospital with 45 beds—a complete block with separate nursing staff and servants. As a result of motor accidents during the past year, 90 in-patients and 144 out-patients were treated in the hospital, at a cost of £514, and the amount contributed was only £34. The expenditure of the hospital in excess of income for the year was £13,209.

Clinical and Laboratory Notes.

FOREIGN BODIES AND NASAL CARRIERS OF DIPHTHERIA.

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NASAL carriers of diphtheria bacilli are common, but foreign bodies in the nares, producing a carrier condition, are rare.

Scholes [1] has seen five cases of unilateral nasal discharge (containing virulent diphtheria bacilli) due to foreign bodies in the nose. In THE LANCET in 1922 Keen and Carson [2] described two cases of nasal diphtheria due to foreign bodies, and Barnes [3] one case, due respectively to shoe buttons and a piece of rubber (but it is not stated that the virulence of the organisms was determined). Also Forbes [4] described a case of nasal discharge due to a button in which the organisms were tested and found to be virulent. In none of these cases does a Schick test appear to have been carried out.

Three Cases out of Nearly Two Thousand.

Some idea of the comparative rarity of the condition may be gathered from the fact that out of a series of 1968 cases admitted to the Ilford Isolation Hospital the condition has only been found on three occasions. The following case is therefore of interest:

A boy, aged 6 years, was found at routine medical inspection at school to be suffering from an unilateral nasal discharge excoriating the nares. A swab was taken which showed morphological Klebs-Löffler bacilli (K.L.B.), and the boy, at the request of the parents, was removed to the Isolation Hospital on June 11th, 1929, and placed in a separation ward for observation. A swab from the right nostril was positive for K.L.B., and from the left nostril negative. The organisms found in the nose were tested on a guinea-pig and found to be virulent. The boy was Schick negative, showing that he was a true diphtheria carrier. On careful examination a foreign body was located far back in the right nostril, and with some difficulty was removed with forceps. The foreign body consisted of a rolled piece of material which proved to be a maker's tape from the back of a man's tie. The nasal discharge ceased after the removal of the foreign body. Swabs from the right nostril were positive for K.L.B. two days later, but became negative 11 days later, and were again negative after a further seven days.

Examination of the maker's tape showed that the tie had been purchased in Exeter, and on inquiry it was found that the boy had visited Devonshire in July, 1928, and at that time had been seen playing with the piece of tape, and also with a small stone which he had pushed up his nose. The stone was recovered from the nose, and it was thought that the tape had come down also. The boy returned home in October, 1928, and in January, 1929, the nasal discharge began. He had been taken to a doctor, who had thought he had a polypus. He had never had diphtheria; no diphtheria cases had occurred at the house in Devonshire and none in Ilford. He had only been in Ilford 11 weeks when he was examined at school; previously to that he had resided at Hackney. On inquiry at Hackney no diphtheria cases could be traced as being due to him.

Two other cases have occurred in Ilford:—

A girl, aged 3½ years, admitted to the Isolation Hospital in June, 1928, with an unilateral nasal discharge of two months' duration. Morphological diphtheria bacilli were found in the culture from the nasal swab. A pea was removed from the right nostril. The nasal discharge ceased and two further nasal swabs proved to be negative, but a Schick test was not carried out in this case, nor was an investigation made of the virulence of the organisms.

A boy admitted to the Isolation Hospital in 1914 suffering from a nasal discharge containing morphological diphtheria bacilli. A shoe button was extruded from the right nostril after a period of seven months, but a Schick test was not

carried out in this case nor was the virulence of the organisms tested. A brother of the boy was, however, admitted to hospital at the same time with a sharp attack of faucial diphtheria, and it is probable that the boy with the foreign body and nasal discharge was a carrier of diphtheria bacilli and infected his brother.

The case which we have recorded in some detail is of interest, as the question arises as to whether the boy was Schick negative because he had immunised himself by infecting his nose with diphtheria bacilli from the foreign body, and so administered to himself small doses of toxin.

Immunisation through the Mucosa.

De Stella,[5] in 1903, showed by experiments on animals that the nasal mucous membrane in diphtheritic rhinitis secretes an antitoxin which neutralises the diphtheritic toxin, and so prevented toxic symptoms resulting. This is probably what happened in the case described. If this is so, a further interesting question arises as to whether it would not be practicable to immunise persons against diphtheria through the nasal mucous membrane instead of by subcutaneous injections.

Peters and Allison[6] have experimented with intranasal immunisation against scarlet fever by spraying the nose every other day with scarlet fever toxin, with the result that a number of Dick-positive persons became Dick negative, while in others the Dick-positive reaction was much reduced in area. It seems theoretically possible to devise a method of intranasal immunisation against diphtheria which would give still more satisfactory results.

If immunisation against diphtheria could be effected through the nasal mucous membrane it would also throw some light on the hypothetical latent immunisation by which natural acquired immunity is supposed to be obtained, for it would appear probable that it is through the nose that such immunity is acquired. It can be supposed that most persons on few or many occasions inhale diphtheria bacilli which produce sufficient toxin in the nose to cause, by repeated doses, immunity to develop, but not enough to cause an attack of diphtheria.

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ORBITAL ABSCESS FOLLOWING REMOVAL OF TONSILS AND ADENOIDS.

BY G. NORMAN CLARK, M.B. ABERD.,
HOUSE SURGEON, BELGRAVE HOSPITAL FOR CHILDREN, LONDON.

A GIRL, aged 4 years and 7 months, had her tonsils guillotined and adenoids curetted, and was discharged from hospital the next day. Four days after the operation she was brought up again looking very ill with a temperature of 102·8° F., marked swelling of the right eyelids, proptosis, and restriction of the movements of the eyeball in all directions. On the following day some swelling of the left eye appeared. A deep incision was made below the right supraorbital border, but no pus was found. Two days later there was no improvement in the condition, the eyeball was displaced markedly outwards, movements were very limited, and there was much swelling of the orbital tissues and injection of the conjunctiva. The incision was deepened inwards, and on introducing a sinus forceps pus was found lying deeply outside the lamina papyracea of the ethmoid, the bone here being bare. The patient had an uneventful convalescence. On discharge the movements of the eye were full, there being only slight ptosis. The *Staphylococcus aureus* and the Friedländer's bacillus were cultured from the pus.

I have to thank Mr. Cecil Wakeley for permission to publish this case.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ANÆSTHETICS.

AT the meeting of this Section on Nov. 1st, with Dr. ASHLEY DALY in the chair, the subject of discussion was

AVERTIN ANÆSTHESIA.

Dr. JOSEPH BLOMFIELD said that avertin was a tri-bromine-ethyl-alcohol, a white crystalline substance which dissolved in water only with difficulty up to 3·5 per cent. The makers had now produced it in a fluid form, in which every cubic centimetre contained 1 gramme. The dose recommended was 0·1 g. of avertin per kg. of body-weight (or two-thirds of a gramme per stone weight). The technique of injection was simple; the solution was run slowly into the rectum by means of a soft tube, which should be passed for four inches; owing to the varying reaction of different patients to anæsthetic drugs it was important that the anæsthetist should be present when the solution was introduced. When a patient had had no more than 4·0 g. he might be unconscious enough to go to the operating theatre. The need for care in dosage was emphasised by a reported case which occurred in this country. A man, aged 25, was prepared for the operation of radical cure of inguinal hernia. Before the avertin he had morphia gr. ¼. The degree of anæsthesia induced by the avertin was not sufficient for the operation, and he was given gas and oxygen. The operation was duly carried out, and he left the theatre apparently in a normal state; yet he never recovered consciousness, and he died eight hours later. The dose given was a safe one, and the autopsy revealed no reason for the death. Dr. Blomfield thought that some undetected error must have been made in the case; nothing comparable to this fatal unconsciousness had come within his own experience.

The induction of unconsciousness following avertin was extraordinarily satisfactory, continued Dr. Blomfield; it seemed to be as pleasant a way of going to sleep as could well be imagined. He had not seen any accompanying excitement. One nervy young man said he felt a strong temptation to try to expel the tube from his rectum; but he was not a good subject for any anæsthetic, since on several occasions he had had ether which he disliked very much, and which made him vomit. Usually respiration became somewhat depressed—i.e., rather shallower and slower—and the condition was not unlike sleep, except that there was somewhat less colour in the face, and stertor easily developed. The blood pressure fell by 10 to 15 mm. of mercury. Often when a patient had avertin unconsciousness the corneal reflex was absent, and yet, if a painful stimulus were applied, a reflex movement occurred, and this would be repeated on the first cut with the knife. The speaker therefore did not rely on absence of the corneal reflex. The best means of knowing that the patient did not need any more anæsthetic was to give strong ether vapour to inhale; if this was taken quietly, without holding of the breath, it was safe to begin the operation. The muscles were relaxed, the breathing was quiet, the circulation was quiet, and the blood pressure was only slightly lowered. Of his own cases, only about a quarter had had a satisfactory anæsthesia with avertin only. Much depended on the patient and the operation. The kind of patient who had given him greatest satisfaction with avertin was the feeble elderly person who was having some such operation as gastrostomy—the kind of patient who sometimes failed to recover after inhalation anæsthesia. Often these old subjects required no other anæsthetic than the avertin. The next satisfactory class were cases of exophthalmic

goitre. On the average, patients who had avertin could be assured of two to four hours' unconsciousness, which was not so deep that it need deter one from using avertin in cases where there was likely to be blood in the air passages. The coma was not so deep as after paraldehyde. He had used avertin for dissection of tonsils, and in other cases where there was sure to be blood in the mouth, and he never had any anxiety on that score.

Summing up, Dr. Blomfield described avertin as a very valuable addition to the drugs available for the anæsthetist. But he thought no attempt should be made to use it as a routine anæsthetic, especially as it was desirable for the anæsthetist to see it actually administered. It gave a very pleasant induction of anæsthesia, and was especially valuable for patients who had had trouble with, or intensely disliked, every other anæsthetic. Also, it added enormously to the safety of such operations as those for exophthalmic goitre.

A Series of 106 Cases.

Sir FRANCIS SHIPWAY said that in the first four or five cases he had anæsthetised with avertin he had used the solid form, while in the remainder of his 106 cases the fluid preparation was employed. He had found that a strength of 2·5 per cent. gave a more even absorption and a more gradual induction than a 3 per cent. solution; also excitement was less likely—though so far he had never seen excitement in any case in which the drug was used. Children might well be given 3 per cent. strength, since they did not retain it as long as adults. Sixty-six of his patients were males, ranging in age from 12 to 72; the ages of the 48 females were from 15 to 66. The patients had also been given morphine and atropine, or morphine gr. ¼ and scopolamine gr. 1/150. Sir Francis thought that body-weight was an unscientific guide to dosage; habits, occupation, and environment must all be taken into account. The alcoholic, the active, and the highly-strung person reacted relatively badly. He had used avertin in 17 abdominal operations, including gastrostomy, and in 20 of his cases it had sufficed by itself. In 31 cases gas and oxygen was used in addition, and in 10 ether was added to the gas and oxygen; 3 received chloroform and ether; and 1 was given chloroform for removal of a growth of the tongue by diathermy. Induction he had found to be quiet and smooth, and usually rapid—so rapid, in fact, that unconsciousness sometimes came on in the middle of a sentence. The patient was placed on his side, as a precaution against obstructed breathing. Patients were always of a good colour with avertin, and he had not had need of any respiratory stimulant. If one should be needed, he thought carbon dioxide the best. After avertin the pulse-rate was slightly increased, and the blood pressure fell by about 10 mm.; the maximum fall he had so far observed was 30 mm. The corneal reflex was usually just present, but in ten cases it had been absent altogether. Among tests of the depth of anæsthesia were the application of picric acid or iodine to the operation area, the application of towel clips to the skin, and depression of the lower jaw. Analysis of the urine of these patients revealed no albumin or blood. One man who had his inguinal hernia operated upon developed bronchitis; he had been given gas and oxygen in addition. On three occasions the avertin to be used was found to be unsatisfactory; it was decomposing. After induction of anæsthesia with avertin the rectum was not washed out. The patient could be aroused for any purpose—e.g., to take fluid—and thereafter relapsed into sleep, sometimes for as long as 12 hours. Fatal cases in which the drug was used showed fatty heart muscle and cirrhosis of the liver.

Sir Francis regarded avertin as a safe means of induction, providing an excellent basis for anæsthesia and especially free from after-effects. It was contra-indicated for patients having a rapid fall of blood pressure, and for people with renal disease. Otherwise it was the most delightful and excellent method of anæsthesia induction he had seen.

Discussion.

Dr. JAMES YOUNG (Edinburgh) said that the impressions he received concerning avertin in 150 cases conformed with those already expressed at the meeting. He noted particularly the ease of induction and the comfort of the patient. The method seemed peculiarly suitable for gynæcological cases, because there was no post-operative sickness. After operations on the pelvic floor vomiting was very liable to burst the stitches. In a series of 154 cases under his observation there were two deaths, but in neither could the avertin be held responsible. He had now reduced the preliminary dose of morphia to gr. ¼, and this had proved an advantage, though the patient required more inhalation anæsthesia.

Dr. I. N. LEWIS referred to his use of avertin in 28 cases. It was most effective in the case of patients whom he could classify as soft thyroids. Possibly a stimulus to the patient's metabolism might hasten excretion of the drug. Hypothyroid cases recovered from avertin more quickly than others. He had had no unpleasant incidents in his cases.

Dr. H. E. G. BOYLE said he had not had any experience with avertin, but he would have thought that giving patients heavy doses of morphia and scopolamine beforehand put them in a position of danger. He suggested that a much smaller dose of avertin than what was now prescribed might be used as a means of premedication.

Dr. COUX said that a drawback to the use of avertin alone was the length of time it had to be given before the operation. In nearly all his cases he had to use some supplementary anæsthetic.

Dr. C. F. HADFIELD commended the method by which avertin was introduced to the profession in this country by the makers, who recognised its danger unless under expert control.

Dr. R. A. RAMSAY spoke of the efficacy of carbon dioxide as a restorative when a case seemed to be doing badly.

Dr. Z. MENNELL said he had not any great experience of the method, but it was one which he disliked for the ordinary healthy person. The cyanosis which occurred with it meant that attention had to be given to the airway, and certainly administration of the drug should not be left to nurses. He did not think the corneal reflex was a guide to the depth of anæsthesia, any more than it was in the case of hedonal. It would be wrong to use avertin as a routine anæsthetic, and also, he thought, for tonsil and adenoid removals, and for big operations on the mouth.

Mr. C. HOPE CARLTON asked whether in Graves's disease the bromine in the avertin compensated for the absence of iodine in the patient.

Dr. HUGH PHILLIPS spoke of the possibility of employing avertin in association with spinal anæsthesia.

Mr. GEOFFREY KEYNES said that avertin had been used in many of his cases, and he had hoped it would enable ether anæsthesia to be dispensed with, especially in abdominal operations. In a case of gastrectomy the avertin was combined with a local infiltration of the abdominal wall, and in a dose of only 0·08 g. per kg. of body-weight it proved so satisfactory that it seemed to be an ideal form of anæsthesia. He had long felt that for gastrostomy nothing but a local anæsthetic was needed.

SECTION OF OTOLOGY.

HISTORY OF THE MASTOID OPERATION.

IN his presidential address to the Section of Otology on Nov. 1st Mr. W. M. MOLLISON traced the history of the mastoid operation from the seventeenth century to modern times. The first reference in the literature was in 1649 when Johannes Riolanus wrote recommending the trephining of the mastoid process. In its earliest days the operation was performed for the relief of tinnitus, or in order to make a new Eustachian tube. The first operation on the mastoid designed to promote the evacuation of pus was carried out in 1740 by Petit, who used a trephine. In 1776 Jasser operated for suppuration by boring a hole in

the bone, through which he forced lotion in order to drive out the pus; this procedure he repeated on 12 succeeding days. The operation fell into disrepute after it had been performed on the Danish Court physician, Berger, for tinnitus and deafness, with a fatal result. It took centuries to evolve a satisfactory method of opening the mastoid process for the release of pus. The radical mastoid operation dated from about 1889, when Zaufal published the operation generally known as Stacke's operation. In the light of present-day knowledge it was clear that at first many patients were subjected to the radical operation quite unjustifiably, and that the total amount of hearing lost because of these initial errors was incalculable. Fortunately, however, this dark period did not last longer than about seven years. The last phase, dating from 1897, was a conservative one, since the aim of modern surgeons was to save the ossicles and thus to preserve the hearing. Mr. Mollison pointed out that there were many different methods of performing the conservative mastoid operation. The bone was removed from the posterior wall far enough to allow of meatal flaps; the outer attic wall was removed to drain the attic and observe the presence of cholesteatoma and the condition of the ossicles; some removed a bridge; others left just enough to support the membrane. If the attic wall was not removed the aditus was exposed and the condition of the incus investigated; if necrosed the incus was removed. The position of the perforation and the amount of hearing were determining factors in the choice of operation. A number of suggestions had been made with the object of facilitating the healing of the wound left by the operation. The wound could be left open and allowed to granulate; it could be allowed to fill with blood clot. Some flushed it by means of the Carrel-Dakin apparatus and others closed it by secondary suture or filled it with bismuth and iodoform paste before suture. Bone-grafts had been used after irrigation with Carrel-Dakin fluid, and zinc ionisation was yet another method of after-treatment. The main object should be borne in mind, and this was to secure a thorough opening of all accessible cells.

In conclusion, Mr. Mollison said that the real triumph of the mastoid operation would lie in the successful treatment of all cases of acute otitis media, if need be by the Schwartze operation, thus eliminating chronic suppuration. In the future the need for a radical mastoid operation in any case would be regarded as an indication of failure.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

AT a meeting held at Liverpool on Oct. 25th, with Dr. G. W. FITZGERALD in the chair, a paper on

TUBERCULOSIS AND PREGNANCY.

was read by Mr. LEYLAND ROBINSON. It was based, he said, upon the answers to a questionaire submitted to experts in tuberculosis, 200 of whom sent replies. This questionaire dealt with the effect of pregnancy on latent, quiescent, and active types of disease, and discussed the treatment, special attention being paid to the value of therapeutic abortion. The main conclusions were as follows: (1) childbirth is always a danger to the phthisical woman; (2) all forms of pulmonary tuberculosis are affected by parturition—latent, arrested, or otherwise; (3) in the interests of the individual it is desirable that reproduction by phthisical patients should be regulated—sterilisation is neither desirable nor probable; (4) special supervision ought to be made for the treatment of pregnant women with tuberculosis in sanatoriums and adequate accommodation provided for labour and the lying-in period; (5) phthisical women who are pregnant should receive the ordinary sanatorium treatment, including artificial pneumothorax; (6) therapeutic abortion has a limited field of usefulness and should be restricted to special cases of early disease in early pregnancy; (7) special antenatal supervision by a skilled obstetrician is an essential part of the routine treatment; (8) the child must be isolated; (9) lactation must be forbidden.

The PRESIDENT said that his impression was that tuberculous women improved during pregnancy but rapidly grew worse in the puerperium.

Dr. C. R. SCHOFIELD (Southport) spoke of the difficulty of getting a pregnant tuberculous woman looked after. He had just had a case of a young girl who developed acute pulmonary tuberculosis and a tuberculous larynx within a month of term. Eventually he did an induction for her but she was dead in three months. He had seen some tuberculous mothers improve during and between pregnancies and others killed by pregnancy. Much seemed to depend on the stage of the disease.

Dr. J. E. GEMMELL (Liverpool) recalled a case of a woman who showed evidence of phthisis after a miscarriage. After years of treatment she was declared cured (physical signs and X rays) and allowed to become pregnant. At the sixth month the disease reappeared and the patient was dead in two months.

Dr. W. W. KING (Sheffield) mentioned a case which improved during pregnancy and rapidly went downhill after delivery. He urged that the diversity of tuberculous disease be remembered. He quoted statistics from an American hospital showing that in comparable cases under comparable conditions only 3–4 per cent. more pregnant than non-pregnant women showed advance in the disease.

Dr. F. H. LACEY (Manchester) quoted figures from the literature showing that the mortality was very little higher in pregnant than in non-pregnant women, but that it was in the first six months after delivery that the prognosis was worst. He thought that tuberculous disease of the larynx or the presence of toxæmia made the prognosis very serious.—Dr. J. W. BURNS quoted a case of marked improvement during pregnancy under sanatorium treatment.—Dr. PERCY MALPAS said that in a recent German symposium the consensus of opinion was against induction of abortion in all three stages of the disease.—Dr. J. H. WILLETT had interrupted a pregnancy early where it occurred in a healed case.—Prof. DANIEL DOUGAL (Manchester) thought Mr. Robinson's paper would become the standard one on the subject. He added that Rist held that pregnancy was inimical to phthisis and thought that this was due to hyperthyroidism asociated with pregnancy. Rist thought highly of artificial pneumothorax and allowed marriage if sputum was free from organisms two years after operation.

Mrs. DOBBIN CRAWFORD read a note entitled

A Useful Perineal Dressing.

After trying many dressings for perineorrhaphy and colporrhaphy wounds, she had come to use the following emulsion of acriflavine: acriflavine, 0·10; liquid paraffin, 76·65; white wax, 3·25; distilled water 20·00. An interval of 24 to 48 hours was allowed to elapse, and at the latest on the third day—the day on which the aperient was given and before the bowels were opened—dressing was begun with a narrow strip of gauze about three inches long soaked in the emulsion, and by means of forceps laid upon the colpo-perineorrhaphy wound. The dressing was renewed after each micturition, and the results had been satisfactory. The dressing had also proved itself of value after confinements in which there had been great bruising of the vulva. Mrs. Crawford had found the emulsion an ideal perineal dressing. The paraffin kept the perineum dry, the flavine kept it clean or cleared up any incipient infection, while the whole was soothing to the patient.—Dr. BURNS agreed about the value of acriflavine. He had found a 1–1000 watery solution useful for swabbing out an infected pelvis and had noted that it had a considerable hæmostatic effect on an oozing surface.

Mrs. CRAWFORD also showed a uterine tumour for diagnosis; Dr. J. W. BRIDE (Manchester) reported a case of hydatid of the broad ligament; and Mr. A. MCMURRAY described a hydatid in the pelvis.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Concluded from p. 929.*)

SECTION OF VENEREAL DISEASES.

DIAGNOSTIC AND OTHER ERRORS IN QUESTIONS OF VENEREAL DISEASE.

Colonel L. W. HARRISON said that a young wife had developed a Bartholin's abscess. The husband had previously been cured of gonorrhœa; nevertheless, he was informed that he had infected his wife. Careful investigation showed that the causative organism of the Bartholin's abscess was *B. coli*. Had this investigation not been carried out the case would have had all the makings of a marriage wreck. The subject of his paper had been suggested to him by the consideration of errors of which he quoted a typical example. Ordinary balanitis was sometimes diagnosed as gonorrhœa, and he knew of a case where a mother had been requested to remove her son from a public school because of such a mistake. Dislike of examining the penis at close quarters accounted for many cases where a syphilitic chancre at the meatus or within the fossa had been diagnosed as gonorrhœa; it was common to see cases of tertiary syphilis where the patient denied having had a sore but admitted gonorrhœa, and it was reasonable to suppose that the discharge had been due to an intra-urethral chancre. Omission of microscopical examination led to many cases of simple urethritis being treated as gonorrhœa. A vaginal discharge was often due to other causes than the gonococcus. A diagnosis should not be made on the strength of a naked-eye examination nor on a single microscopic test. A urethral discharge was sometimes due to the breaking down of a prostatic abscess, and this had at times been diagnosed as gonorrhœa on the appearance of the discharge or on the faulty staining of microscopical specimens. Epididymitis, especially if accompanied by a urethral discharge, often suggested gonorrhœa to the practitioner to the exclusion of infections with *B. coli* or *B. tuberculosis*. He had known some cases of right-sided gonococcal epididymitis diagnosed as appendicitis; the absence of rigidity of the rectus and tenderness of the cord at the ischio-pubic ramus should have indicated the nature of the lesion. Colonel Harrison emphasised the value of the microscope, a culture tube with properly made medium, and the complement-fixation test as aids to diagnosis, but pointed out that they did not make unnecessary a careful clinical examination. He thought that innocent prostates and seminal vesicles were often condemned for trouble which lay in the anterior urethra. Proper cleansing of the urethra was an essential preliminary to expression of the prostatic secretion for microscopical examination, as otherwise this might become mixed with pus cells derived from the anterior urethra. In syphilitic infections he deplored the pernicious practice of commencing treatment of early cases on a mere suspicion. Promptitude in commencing treatment was certainly important, but not so important as certainty of diagnosis. He quoted an article by Dr. J. H. Mitchell entitled Menace of the Slightly Positive Wassermann Reaction, where this author related cases in which a faulty diagnosis had been made on a weakly positive W.R. alone, or in conjunction with non-specific dermatoses, the result being the firm establishment of that intractable disease "syphilophobia." He had always taught that if a report of a serum reaction as positive was not supported by the clinical data, another specimen of blood should be examined. Extragenital chancres, he pointed out, were a common source of error. He remembered the case of a chancre of the tonsil being enucleated, which was later sent to hospital as a case of measles, the true diagnosis being reached only when the eruption did not clear up in the time usual for measles. A frequent mistake was to assume that all abnormalities were syphilitic in patients with a positive W.R. Tertiary syphilis of the tongue had led to many epitheliomata being overlooked; on the other hand, gummata of the testicle had been removed under the impression that they were new growths. The tendency in nervous diseases was to think of syphilis and in cardio-vascular disease to forget it. In skin rashes occurring during syphilitic treatment the greatest caution had to be exercised; one must consider most seriously whether the rash was not due to the arsenic and on no account continue with the arsenical treatment until it had been clearly established that arsenic was not the cause; neglect to adopt this precaution might easily lead to the death of the patient. Bismuth also, it must be remembered, might cause a troublesome dermatitis. In venereal diseases one must look for and gather all the evidence, and then sift it with judgment and with common sense.

Discussion.

Dr. DAVID LEES said that Colonel Harrison emphasised chiefly the type of case in which venereal disease was wrongly diagnosed rather than that where the diagnosis of venereal disease was overlooked. In any class of patient the medical attendant hesitated to consider such a diagnosis, and still less to suggest it to the patient; his mind was blurred by the moral issue involved. He cited the case of a boy of 8 years with marked synovitis of both knee-joints where the doctor had negatived the diagnosis of inherited syphilis on the high moral standing of the parents; it eventually transpired, however, that the child had been adopted. A common diagnostic error was made in ulceration of the leg; any lesion of this type which was not associated with definite varicosity of the veins, with an atrophic skin, or depressed circulation with trauma, or, in women, with a history of uterine sepsis, must always be suspect. There were many subjects of inherited syphilis who showed few, if any, of the classical stigmata. He quoted a case where a wrong diagnosis of osseous sarcoma was corrected by tracing the family history of the patient's mother, who had a syphilitic ulcer of the leg. He also deprecated the practice of commencing treatment of syphilis on mere suspicion. It was little short of malpraxis to treat the diagnosis of syphilis lightly. Clinical, bacteriological, and serological methods of diagnosis were now so accurate that their intelligent use should make a diagnosis possible in nearly every case. The most difficult ones were perhaps those of herpes genitalis, especially after treatment by strong antiseptics. He deprecated the therapeutic test as a method of diagnosis, and in particular the use of the provocative injection until the end of the fourth week. He noted the frequency with which tuberculous lesions manifesting themselves after an attack of gonorrhœa were diagnosed as sequelæ of gonorrhœa, and quoted instances where the urethroscope was an essential aid to diagnosis.

Dr. MARGARET RORKE said that she had frequently encountered a *B. coli* infection simulating gonorrhœa, especially in the young bride and where there had been brutal coitus. She pointed out that a salpingitis, accompanied by gonoccocal urethritis, was not necessarily gonorrhœal; she had seen many cases where the infection was tuberculous. She deprecated the use of the term "weakly positive Wassermann," recommending that the term "doubtful" should be used instead. A patient either had or had not syphilis; treatment should not be administered until the diagnosis was established.

Sir ROBERT BOLAM suggested difficulties in diagnosis presented in lichen planus and in Bazin's disease. A venereologist should be a fine physician with a broad outlook.

Dr. GORDON WHITEHEAD cited a case of carcinoma of the penis simulating a primary sore. He emphasised the importance of examining the marriage

partner in cases of discharge where the gonococcus could not be demonstrated. The lesson of this discussion was that a thorough and complete examination of every patient was imperative.

Dr. A. C. ROXBURGH described a series of cases where the diagnosis was not obvious, including indurated herpes simulating a primary sore, and a syphilitic rash mistaken for eczema.

Dr. WHEELER HART recalled cases of discharge from the use of too strong antiseptics, and endorsed all that had been said about early and complete treatment.

PREPARATIONS OF BISMUTH IN THERAPY OF SYPHILIS.

Dr. SVEND LOMHOLT (Copenhagen), who opened this discussion, said that bismuth was now adopted by practically all syphilologists throughout the world as a substitute for mercury. It was more efficient and less toxic than the older remedy. Bismuth could be administered only by muscular injection, since it was but slightly absorbed through the skin and intestines. The number of preparations now on the market made it difficult for the doctor to make a right choice. Very little was known with regard to the effects of bismuth on the syphilitic organism and the syphilitic infection itself. The bismuth content of the blood at any time during treatment was always small; therefore bismuth did not act directly on the spirochætes. Dr. Lomholt quoted Levaditi's theory of the formation of a compound of bismuth with protein substances, this compound being toxic to spirochæte. In Dr. Lomholt's experience the best effect in treatment is obtained when large quantities of bismuth are introduced, producing in the organism a high bismuth concentration, which should never, however, reach the point of intoxication. This concentration should be maintained over a long period, but care must be taken that the organism does not become oversaturated with the drug. The essential thing is to obtain a regular and uniform absorption. In intravenous injections the absorption is rapid and regular, but clinical experience proves it to be dangerous. Moreover, the bismuth is rapidly eliminated and therefore daily injections are necessary, a factor which makes the treatment rather troublesome. Subcutaneous injections cannot be recommended; they cause greater pain than the intramuscular method and absorption is slow and more irregular. Intramuscular injection thus is the treatment of election. If a certain amount of bismuth is injected into a muscle and is not immediately absorbed, it becomes encapsuled and the rate of absorption decreases, with impairment of the therapeutic effect. X ray photographs of the nates sometimes demonstrate these encapsuled deposits. The most rapidly and regularly absorbed solution of bismuth is the watery solution. Even small doses, however, cause pain and therefore solutions of bismuth compounds in oil have been employed. Injection of these preparations is less painful, but the absorption of the bismuth is rather slow and irregular. He thought that possibly too much stress was laid by manufacturers and physicians on the production of a painless preparation.

Rates of Absorption and Elimination.

Dr. Lomholt discussed the rates of absorption and elimination of the various compounds of bismuth. He said that the slow and irregular absorption of the oily suspensions is least marked with potassium-sodium-bismuth-tartrate, iodoquinate of bismuth, and bismuth salicylate. The tartrate has the drawback of a varying composition and content of bismuth metal, the iodoquinate has a rather low bismuth percentage, and is rather irritant; but the salicylate has no such drawbacks, and in his view is the most suitable for use in an oily suspension. Of the watery solutions, preference should be given to compounds of restricted solubility. The oxychloride is pure and stable, and therefore makes a good preparation. The daily dose of bismuth metal may be fixed at about 0·5 mg. per kilo of body-weight, higher doses being required with remedies of a slow and incomplete absorption. After four or five injections a thin blue line is generally seen along the edge of the gums; this sign is seen with all intensive treatment and is a sign of strong saturation. The injections should be given in the usual place and manner, but the needle should be retracted slightly during the injection to limit the risk of forcing the fluid into a vein or artery. Should the fluid pass into an artery a serious infarct of muscle and skin may ensue.

No treatment of syphilis should be given, he said, as a mere routine; each single case should be considered by itself. Dr. Lomholt concluded his address by showing tables illustrating the absorption, storage, and elimination of bismuth in a number of animal experiments.

The Fate of the Bismuth.

Mr. V. E. LLOYD said that it was essential to possess an accurate knowledge of the fate of the bismuth used. It was clear from Dr. Lomholt's address that there was considerable variation in absorption, which was dependent mostly on solubility. Well-defined deposits had been seen by X rays 12 to 15 months after cessation of treatment. He asked whether encapsulation had taken place in these cases, and whether the presence of an unabsorbed focus was a counter-indication to further bismuth therapy. If so, what methods could be adopted to promote absorption? He believed that pain varied with the anatomical site and the bulk of the injection. As to intoxication this might perhaps be avoided by giving a rapidly absorbed solution in the early stages and a more slowly absorbed one later. It seemed from Dr. Lomholt's tables that most of the bismuth was found in the organs of elimination and detoxication—viz., the liver, kidneys, and intestines.

Dr. MORNA RAWLINS asked what constituted the toxic point of bismuth therapy. In her opinion the blue line was always associated with pyorrhœa; she herself had never found it in edentulous adults, and rarely in children. Pain was rarely complained of in women and children, and in her view was due more to faulty technique than to the type of preparation used. She asked whether Dr. Lomholt considered that absorption was diminished when the body was saturated with bismuth.

Dr. DAVID LEES asked whether the results of animal experimentation were applicable to human beings. He had yet to see a stomatitis from bismuth in a young child with good teeth or in the edentulous. He also attributed pain largely to faulty technique. Massage was of great value in its elimination. He was not prepared yet to accept bismuth as a substitute for arsenobenzol.

Colonel L. W. HARRISON said he had had difficulty in reconciling the findings of different investigators; he attributed the discrepancies to the use of different animals for experimentation. The blue line was one sign of toxicity, but more attention should be paid to the kidney. It was desirable to know the maximum dose that could safely be given; the tendency was to give too little. Dr. Lomholt had advised against the deep subcutaneous method, but Colonel Harrison had not found this to be painful with the oxychloride, the metal, or the salicylate in oil. There was less danger of intravascular injections if the deep subcutaneous method was used. It had been observed that with massage bismuth appeared in the blood two to three hours after injection; without massage it did not appear for 24 hours. Massage should produce more regularity in absorption.

Dr. TYTLER BURKE suggested that a false premise had been involved; neither arsenic nor bismuth by themselves were direct spirochæticides. He would like to know what Dr. Lomholt's experience of the use of metallic bismuth had been. He himself believed the blue line to be due to the presence of sepsis. In his experience children tolerated bismuth cream better than mercurial cream.

Reply.

Dr. LOMHOLT said that it was risky to draw too definite a conclusion from the results of animal experimentation, but mercury experiments with rabbits and with man gave very parallel results. He agreed that faulty technique might cause pain, but there was no doubt that there was a great difference in pain production between the different preparations. In his experience the therapeutic value of colloidal preparations was markedly inferior, although more could be given. Intoxication by bismuth was much rarer than by mercury. Bismuth-treated patients commonly showed the blue line even when they had well-kept mouths; but he agreed that in the absence of oral hygiene the blue line would be found still more frequently. The cause was, of course, the H_2S precipitating the sulphide of bismuth in the gums. It was his definite opinion that, even with perfect hygiene, all people would show the blue line after a course of 10 to 12 injections of an ordinary volume of bismuth. He did not recommend the use of quickly absorbable preparations at first, followed by the more slowly absorbable; he preferred a regular absorptive rate. The amount of bismuth stored in the tissues was only half that of mercury, indicating a more rapid elimination. He would rather make the intervals between the injections shorter, especially as intoxication was less easily reached with bismuth than with mercury. With regard to the correlation of the findings of different experimenters using different animals, he had found that guinea-pigs did not tolerate the injections as well as rabbits; elimination appeared to be constant, however, for all metals with all the animals used. The highest safe dose could not be determined for man from animal experimentation. He was inclined to regard up to 25 mg. per day as a safe dose. It should be remembered that bismuth was given in doses three to four times as big as those of mercury, and often in greater dilution; their relative toxicity could not therefore be fairly contrasted. He had not investigated the deep subcutaneous method with bismuth, and was not aware that it was being used. A Swedish investigator had found that mercury given by this method was painful, and the rate of absorption slower. He had had no personal experience of the use of metallic bismuth; he knew that one form was used in the early days, but had been given up since it caused necrosis. Suspended in oil it was very slowly absorbed. As for percutaneous administration absorption was very very slow.

THE LONDON MEDICAL EXHIBITION.

(*Concluded from p. 950.*)

SURGICAL INSTRUMENTS.

ALLEN AND HANBURYS, Ltd. (Bethnal Green, London, E.), had an attractive selection of surgical instruments of every description and made a special feature of Statham's Improved Tubal Injection Syringe for injecting lipiodol under control of the X ray screen, with a luminous dial to the pressure gauge, allowing it to be read in the X ray dark room. Attention was also drawn to instruments for the introduction of radium needles and radon seeds and to the St. Bartholomew's Hospital Operation Table with new patent self-locking device for obtaining the Trendelenburg position.—DOWN BROS., LTD. (21 and 23, St. Thomas's-street, London, S.E.), presented a large selection of surgical instruments and appliances, prominent among which were Ivan Magill's Portable Intratracheal Apparatus for chloroform, Lane Joynt's skin-grafting instruments for large grafts, and sets of diagnostic instruments fitted with electric light. Putti's orthopædic operation table, for which Down Bros. are the sole agents, also received attention.—MAYER AND PHELPS, Chiron House (59–61, New Cavendish-street, London, W.). The high standard of surgical instruments made by this firm is well maintained, and among notable instruments to be seen were Rowbotham's Tracheal Intubation Apparatus for use via the mouth or nose, allowing a constant positive pressure and preventing the possibility of aspirating fluids into the lungs, Forceps for the introduction of radium capsules as made for the Radium Institute, and Pepper's Hæmostatic Guillotine for bloodless tonsil enucleation.—ARNOLD AND SONS (Savory and Moore (1928)) (50–52, Wigmore-street, London, W.) made a feature of their improved and inexpensive pedestal operation table on oil pump base, while attention was called to their "Clearlite" forehead lamp and to their anæsthetic apparatus and blood pressure instruments. A notable exhibit was the rubber sponge cushions for use on anæsthetic stools.—THE HOLBORN SURGICAL INSTRUMENT CO., LTD. (26, Thavies Inn, Holborn Circus, London, E.C.), displayed a large variety of chrome-plated surgical instruments and their Holborn pedestal operation table attracted much attention—mounted on an oil pump it has a chrome-plate top which tilts to any angle and if required the table can, in addition, be fitted with a lateral movement.—Subaqueous Intestinal Bath Apparatus (Agent: F. Rossendale, The Manor Cottage, Gerrards Cross, Bucks). Demonstrations of this apparatus were given, its merit being the ease with which it can be adjusted to the patient, the facility with which the returning liquids and solids are disposed of, and the prevention of obnoxious smell.—PHILIPS LAMPS, LTD. (145, Charing Cross-road, London, W.C.). The Metalix-Portable X ray outfit exhibited by this firm attracted a continuous stream of inquirers, for the apparatus can be erected in a few minutes and after attachment to any convenient light socket radiograms can be taken by simply pressing a button. The two packages in which the complete outfit is contained can be carried wherever required. The apparatus is so insulated that there is no danger from electric shock. A wide range of X ray tubes was also included in this exhibit.—Mr. R. H. DENT (309, Oxford-street, London, W.) showed a wide range of "Ardente" appliances for the deaf suitable for many and varied cases. Some of the appliances are inconspicuous, and all of them give good tonal results.—BRUCE AND EVELYN, Surgical Corsetières (47, Wigmore-street, London, W.), had an interesting display of corset belts, and belts for all kinds of surgical conditions, special attention being paid to lightness and efficiency.—DOMEN BELTS CO., LTD. (456, Strand, Charing Cross, London), presented a wide selection of belts, based on physiological and anatomical considerations, for pregnancy, accouchement, and general support, for hypogastric and gastroptosis, for floating kidney, as well as an umbilical hernia belt.—THE SCHOLL MFG. CO., LTD. (Granville-square, London, W.C.), showed a wide selection of appliances constructed on anatomical principles for the relief and correction of acquired foot troubles.—SHORT AND MASON, LTD., "Tycos" (Aneroid Works, Macdonald-road, London, E., and at Atlantic House, Holborn Viaduct) exhibited their well-known sphygmomanometers and clinical thermometers as well as an extremely sensitive recording barometer. All these instruments are of excellent quality.—BRUCE, GREEN AND CO., LTD. (14, 16, 18, Bloomsbury-street, London, E.C.), presented a variety of well-made optical and electrical apparatus, including ophthalmoscopes and retinoscopes, optical trial sets, and sets electrically illuminated for the examination of the ear, nose, and throat.—KODAK, LTD. (Kingsway, London, W.C.), made an effective display of their clinical cameras, lantern slides, films, intensifying screens, developing tanks, and accessories for X ray dark rooms, and photographic materials for still and moving pictures of medical subjects.

MILK AND FOODS.

GLAXO LABORATORIES (56, Osnaburgh-street, London, N.W.). The various forms of dried milk exhibited by this firm included Sunshine Glaxo or

humanised milk with added Ostelin, a physiologically standardised concentrate of vitamin D, prepared by irradiation; Standard Glaxo, a full-cream milk; Glaxo Malted Milk; and Glax-Ovo, described as a food drink. Ostelin is available in many forms including colloidal calcium with "Ostelin" Vitamin D ampoules for subcutaneous injection, tablets, and in emulsion with vegetable oil and pure calcium glycerophosphate.—LIBBY, MCNEILL, AND LIBBY, LTD. (8, Great Tower-street, London, E.C.). The merits of Libby's evaporated milk were demonstrated at this stall, and extracts from scientific literature were distributed showing that the vitamin content of evaporated milk is as satisfactory as that of raw milk. It was also pointed out that the vitamins A, B, and D were not lost in Libby milk, but that orange-juice or tomato-juice should be given in conjunction with it to supply vitamin C.—TRUFOOD, LTD. (Wrenbury, Cheshire, and Lever House, Blackfriars, London), displayed their various pure milk products, calling special attention to Trufood full cream which can be used from 9 months onwards and for general purposes, pointing out that it is particularly useful to follow breast feeding or Humanised Trufood. Secway, a pure sweet whey in powder form, also received much attention.—COW AND GATE, LTD. (Guildford, Surrey), attracted attention with their display of Cow and Gate milk prepared by a special roller process under the most scientifically controlled conditions and the claim is made that the milk is adjustable to any infant condition. Prominence was given to Lacidac, which is the dried milk to which lactic acid has been added. This is prepared for use by the addition of hot, boiled water and is recommended in convalescence from acute infections, marasmus, eczema, and in diarrhœa and vomiting.—NESTLÉ AND ANGLO-SWISS CONDENSED MILK CO. (6, 8, Eastcheap, London, E.C.), in addition to their full-cream condensed milk, in which the vitamins and milk salts are retained, showed milk food in powder form prepared from full-cream milk, malted wheat products, and tasteless principles of cod-liver oil. Lactogen, made from dried milk with the addition of lactose and approximating to mother's milk, also received marked attention.—BOVRIL, LTD. (148–166, Old-street, London, E.C.). Bovril, which was effectively displayed both in the form for general use and the unseasoned Invalid Bovril, is too well known to need any description.—HOVIS, LTD. (London, Macclesfield, Manchester, and Bristol), had an exhibit showing the superiority of Hovis Bread in regard to vitamin B content, and demonstrated that one slice of their bread weighing 1 oz. contains as much vitamin as 2 oz. of wholemeal and as 5 to 6 g. of fresh yeast.—BENGERS FOODS, LTD. (Otter Works, Strange ways, Manchester), in addition to their well-known food, displayed Liquor Pancreaticus, Liquor Pepticus, Liquor Thyroididin, Pancreatised Lentil Flour, and other digestive preparations.—BRAND AND CO., LTD. Mayfair Works, Vauxhall, London, S.W.), presented their preparations which are made under hygienic conditions, and include Essence of Beef and Chicken, Meat Juice, Liquid Peptone, and Ferrocarnis, a pleasantly flavoured solution of iron in organic combination with concentrated meat juice.—CADBURY BROS., LTD. (Bournville), exhibited samples of their well-known chocolate and cocoa.—FRANK COOPER, LTD. (Victoria Works, Oxford), had an attractive display of their popular "Oxford" Marmalade, which has a distinct flavour of the Seville orange and is made under strictly hygienic conditions, while every process is done by hand and no preservative or colouring matter is used. In it all the essential properties of the orange are preserved in a high degree. Horsedish Cream, made from freshly grown horse-radish and the best dairy cream without preservatives, as well as an appetising fresh mint jelly, also received much attention.—H. A. G. COFFEE CO., LTD. (40, Theobald's-road, London, E.C.), had an interesting exhibit, showing by models and pictures the action of caffein on the human system and of their coffee from which the caffein has been removed. This pure coffee is not affected either in flavour or aroma, as the sample cups offered to visitors demonstrated.—W. GAYMER AND SON, LTD. (Attleborough and London), whose exhibit at this exhibition is the first since 1912, are cyder makers to the King, and they specialise in dry cyders for medical requirements. The cyder, which is made from English apples only, is pleasing to the palate and was much appreciated by the many inquirers at the stall.

MISCELLANEOUS.

KOLYNOS INCORPORATED (Chenies-street, London, W.C.) showed their well-known preparations, including dental cream which is antiseptic and does not in any way injure the enamel of the teeth; liquid Kolynos, which can be used as a mouth-wash, gargle, or spray; a denture powder, a new preparation for thoroughly cleansing artificial teeth and dental plates; as well as a delicately scented skin soap.—J. C. ENO, LTD. (Fruit Salt Works, Pomeroy-street, London, S.E.), displayed their useful saline laxative; and THE THERMOGENE CO., LTD. (160, Piccadilly, London, W.), the scientifically prepared cotton-wool sold under the trade name, which stimulates the circulation in the affected part of the body to which it is applied and relieves congestion and inflammation.—UNITED WATER SOFTENERS, LTD. (Aldwych House, London, W.C.), demonstrated their "Permutit" household water softeners which do not impair the palatability of the water. Plants suitable for softening water on a larger scale were also shown.—KEEN, ROBINSON AND CO. (Carrow Works, Norwich), among other exhibits, showed Almata, described as a food for infants, a galactagogue, and a supplementary diet for invalids: and Keen's Mustard Ointment.—THE MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE SOCIETY, LTD. (330, High Holborn, W.C.). This mutual Society of medical and dental practitioners, which was founded in 1884 for the purpose of enabling doctors and dentists to obtain sickness, accident, and life insurance on more advantageous terms than those offered by proprietary companies, was well represented, and members of the staff were constantly in attendance to demonstrate the advantages of insuring with a professional society.—THE MEDICAL AGENCY (William H. Grant, Watergate House, 15, York-buildings, Adelphi, London), which undertakes all forms of medical accountancy and obtains capital for medical practices through banking channels, in addition to negotiating for medical and dental practices, and effecting all forms of insurance, demonstrated to medical men the services offered by the firm.

SPAS AND MEDICINAL WATERS.

In addition to the interesting displays of photographs and literature by the English spas of Bath, Buxton, Harrogate, and Torquay, INGRAM AND ROYLE, LTD. (Bangor Wharf, 45, Belvedere-road, London, S.E.), made an imposing show of mineral waters, salts, and pastilles, including Carlsbad Water, Hunjadi János, Vichy-Célestins, and Contrèxeville-Pavillon.

MEDICAL AND SCIENTIFIC PUBLISHERS.

BAILLIÈRE, TINDALL AND COX (7 and 8, Henrietta-street, London, W.C.) exhibited a large number of books published by their own and other firms, and WILLIAM HEINEMANN, LTD. (99, Great Russell-street, London), also showed a large number of the latest medical and surgical works, while H. K. LEWIS AND CO., LTD. (136 and 140, Gower-street, and at Gower-place, London, W.C.), in addition to medical books published by the firm, called attention to their medical and scientific library. Notable exhibits at this stall, which provoked many inquiries, were the Register Doctors' Cabinet for holding index system cards and the Roll-Top Cabinet made specially to hold panel cards and envelopes issued by the Ministry of Health. These cabinets are soundly constructed in oak and are very convenient fitments for the surgery.

Reviews and Notices of Books.

ENDOCRINE DISORDERS.

By Prof. HANS CURSCHMANN, M.D., D.Ph., Director of the Medical Clinic, University of Bostock. London: Humphrey Milford, Oxford University Press. 1929. Pp. 188. 12*s.* 6*d.*

"Endocrine Disorders," by Prof. Hans Curschmann, has recently been added to the series of Oxford Medical Publications, and is a thoroughly clinical and practical monograph. Endocrinology has advanced so rapidly during the last 50 years that the standard text-books of medicine have scarcely succeeded in keeping pace with it. The sections devoted to endocrine subjects are meagre compared with those which bear such established headings as circulatory or alimentary disorders. On the other hand, the special monographs on endocrinology tend to supply the practitioner with a mass of anatomical, physiological, and experimental data which he does not require. This book is compact, and gives a clear account of the various glandular syndromes in under 200 pages. The author has drawn largely from the work of the mid-European authorities and from his own wide personal experience. The chapters on disorders of the thyroid and parathyroid deserve special praise. The author discusses the various forms of Graves's disease, pointing out that the metabolic, circulatory, and other symptoms of these syndromes are essentially the same, and that there is a ready transition between the different types. The factors concerned in hypoparathyroidism, tetany, calcium deficiency, and spasmophilia are clearly defined. In the chapter on pituitary disorders there are one or two notable omissions. No reference is made to the suprapituitary craniopharyngeal pouch cysts and their symptoms, or to the syndrome associated with the chromophobe adenomata. On the other hand, the accounts of acromegaly and of diabetes insipidus are admirable. This chapter also includes an interesting general discussion on the ætiology of endogenous obesity and emaciation. Dr. F. Prange coöperates in the chapter on gonad dysfunctions. In the remaining chapters the arrangement of the subject matter, in itself very complete, is not wholly satisfactory. One finds, for instance, scant mention of the sex disturbances associated with tumours of the adrenal cortex in the adrenal chapter, but a good account in that dealing with the pineal gland. Here also a considerable amount of space is devoted to a discussion of the various types of infantilism, though there is, of course, no suggestion in the text that the pineal is an ætiological factor in any of them. As a supplement to the standard text-books of medicine the monograph can be recommended both to students and practitioners.

DISEASES OF THE MOUTH.

Third edition. By STERLING V. MEAD, D.D.S., Professor of Oral Surgery and Diseases of the Mouth, Georgetown Dental School. London: Henry Kimpton. With 336 illustrations and 43 colour plates. Pp. 727. 42*s.*

NOT many years ago a volume of over 700 pages would have been considered a liberal allowance for an account of the whole of dentistry. But the last few years have seen the appearance of many large volumes devoted to various aspects of odontology. We are constrained to admire the industry of the writers, chiefly trans-Atlantic, who produce these massive tomes, the enterprise of the dentists who purchase them, and the advances of such a comparative young and limited branch of medicine which have produced such an extensive literature. There remains some doubt, however, whether so vast a literature is really justified by the growth of our knowledge, and whether books on dentistry could not be made more concise without detriment.

The fact that three editions of this work have been called for in less than a year is a tribute to its worth which is on the whole merited. It represents an attempt to include in one work all the diseases of the mouth, both those connected with the teeth and those arising from other sources. Such strictly dental conditions as periodontal infections, diseases of the dental pulp, malformations of the teeth, malocclusion, and impacted teeth are dealt with, and in addition there are accounts of tumours innocent and malignant, of specific infectious diseases such as syphilis and tubercle, diseases of the blood system as they may affect the mouth, diseases of the mucous membranes, and so forth. Its appeal is thus to dentist and to doctor. The convenience of a book which covers the whole range of stomatology cannot be denied. The strictly dental section is sometimes disappointing, as if the author had included it only for the sake of completeness and without conviction that it would be helpful. The five pages devoted to diseases of the dental pulp are inadequate, and so are the three or four on malocclusion. On the other hand, the accounts of the various disorders of the mucous membrane are excellent and give the dental reader a good idea of common conditions which his hospital training tends to leave out of account. The chapters on tumours are also good, though the account of the odontomas ignores much valuable work done in this country. In the description of salivary calculus there is no mention of the work of A. Bulleid on the rôle of the leptothrix in its formation.

There are inaccuracies and omissions, and in some ways this voluminous work seems to give a curiously scrappy effect. But on the whole it is a very sound and informing book. The bibliographies are full and international, while the illustrations, especially the coloured plates, are excellent. Its rapid popularity is not surprising.

PREVENTION OF HUMAN TUBERCULOSIS OF BOVINE ORIGIN.

By WILLIAM G. SAVAGE, B.Sc., M.D. Lond., D.P.H., County Medical Officer of Health, Somerset. London: Macmillan and Co., Ltd. 1929. Pp. 195. 10*s.* 6*d.*

Dr. Savage calculates that the number of deaths due to tuberculosis of bovine origin in this country was, in 1927, 1945. The table from which this figure is quoted was prepared on the assumption that 1 per cent. of the respiratory and 23 per cent. of the non-respiratory tuberculosis in each year is of bovine origin. The total deaths calculated on this basis have fallen from 3382 in 1918 to the figure quoted above. Dr. Savage admits that the method employed for determining these figures may be open to question, but it would be difficult to devise a more satisfactory method of arriving at statistics without a very elaborate bacteriological investigation of fatal cases. The number of cases of bovine origin which recover cannot be ascertained, since the notification statistics are not informative on this point.

On the prevalence of tuberculosis in cattle the author gives various methods of arriving at reliable data. Unfortunately, none of these methods is free from difficulties, but the various figures quoted from numbers of counties and county boroughs show that the percentage of tubercle-positive milk samples examined varies from 0 to 13·2 per cent. Dr. Savage also examines, with great care, the various methods which have been suggested, and those which are in actual use for the prevention of bovine tuberculosis. A detailed investigation of these points occupies the greater part of the second half of the book. The author deprecates attempts to tackle the reduction of bovine tuberculosis in a piecemeal fashion. If anything of value is to be done a large and comprehensive scheme must be evolved, including all sides of the question, bacteriological, veterinary, and agricultural. The production of an artificial immunity against the tubercle bacillus and the rearing of resistant herds are methods still in the experimental

stage. Dr. Savage discusses Prof. Calmette's work with B C G in detail, and leaves us with the impression that he is not hopeful of its ultimate prospects. He also deals at length with the theory held in some quarters that the bovine tubercle bacillus is of lower virulence than the human: he finds that the evidence to substantiate the theory is inadequate. On the question of the immunising value of tuberculous milk Dr. Savage is quite definite—it is, he says, "a procedure so unwarranted that I feel its advocates cannot have realised its full implications."

Every public health worker and every bacteriologist specially concerned with the tuberculosis problem will be glad to keep this book upon his shelves as a large source of unbiased information. In his preface the author states that the literature of his subject reveals neither unanimity on the remedies nor agreement on the facts. He himself has gone far towards clearing the ground.

THE NERVOUS CHILD.

Fourth edition. By H. C. CAMERON, M.D., F.R.C.P., Physician in Charge of the Children's Department, Guy's Hospital. London: Humphrey Milford, Oxford University Press. 1929. Pp. 249. 7*s.* 6*d.*

THE greater part of this popular book is unaltered, but it has been enriched by a new chapter on the underlying disturbances of metabolism in the nervous child. Here Dr. Cameron has set out in a lucid and persuasive manner the views to which he has from time to time given expression on the relation of ketogenesis to the various manifestations of neurosis in childhood. The sudden disturbances of health to which certain children are liable, varying in their form but typified by cyclic vomiting, are associated with a failure to mobilise sufficient carbohydrate to achieve the complete metabolism of the fat which has been absorbed. It is here suggested that this metabolic disturbance may be dependent on a temporary functional impairment of the suprarenal glands, the acidosis itself producing secondary results such as catarrh of mucous surfaces and attacks of bronchial asthma. Dr. Cameron does not pursue further the ætiology of the suprarenal insufficiency, but he implies that a diet too rich in fat may be a contributory factor; he stresses the fact that the symptoms are seen more often among the children of the well-to-do than in hospital practice. The principal lines on which these disorders may be combated are an adjustment of the diet (for which full details are given) and the administration of alkali and of glucose. This chapter adds considerably to the interest of the book; it also, however, introduces into it material which is somewhat more contentious than the original chapters. It will appeal to the reader as a brilliant exposition of one view of a question on which unanimity has not yet been reached.

USE OF SYMPTOMS IN DIAGNOSIS OF DISEASE.

Ninth edition, thoroughly revised. By HOBART AMORY HARE, B.Sc., M.D., LL.D., Professor of Therapeutics and Diagnosis in the Jefferson Medical College of Philadelphia. London: Henry Kimpton. Pp. 528. 30*s.*

IN the present preface to this familiar book Prof. Hare quotes Dr. Maitland Ramsay's words: "At the present day the purely clinical side of medicine is spoken with a certain condescension and is apt to be undervalued. . . . There is too little study of what used to be called the face and mind of disease." This book has been designed according to the plan which is actually followed in practice—namely, to build up a diagnosis by grouping the symptoms. For instance, instead of describing locomotor ataxia, the author provides a section on the various forms of loss of power in the legs in which ample data for differential diagnosis between various nervous diseases will be found. Similarly, the short but excellent chapter on coma covers a great variety of diseases, all producing this important symptom.

The plan adopted implies, consequently, the power of the author to pass on to his reader his experience of symptoms in practice in such a way that they may be readily assimilated and correlated with the general experience of medical men. The chapter headings give a key to the arrangement of the work. The face includes expression, colour, deformity, paralysis, and spasm; the skin—its colour, eruptions, scars, moisture, dryness, anæsthesia, hyperæsthesia, and paræsthesia; and the tongue (to take a third example), general appearance, coating, fissures, ulcers, eruptions, atrophy, hypertrophy, paralysis, tremor, and spasm. There are excellent chapters on abdominal disease, on the nature of the fæces, on vomiting, and on the thorax and its viscera, each built up on the symptomatic plan. The chapter on the eye deserves special mention on account of its admirable illustrations and its explanation of the art of diagnosis in plentiful supply throughout the whole volume.

This book has been and will be widely read by all and especially by those who have felt that in recent years the scientific aspect has unduly overshadowed the art of medicine.

JOURNALS.

LIVERPOOL MEDICO-CHIRURGICAL JOURNAL.—Efforts to restart this journal, the organ of the Liverpool Medical Institution, which ceased to appear during the late war, have been successful, and the thirty-seventh volume appears this month. It contains a number of interesting papers, the first of which is the inaugural address on Harvey delivered by Prof. John Hay, at the opening of the ninetieth session of the Institution. Dr. C. O. Stallybrass, assistant medical officer of health, writes on acquired immunity in human populations, Mr. Watson Jones on the treatment of fractures by intramedullary pegging, and Mr. Howel Evans on some hæmorrhagic conditions. Dr. I. Harris publishes an article on the diagnosis of chronic myocarditis by means of the electrocardiograph, and Dr. M. Datnow discusses the effect of lead on the tissues. Dr. Stuart McAusland advocates the treatment of varicose veins by injection, and Dr. Alston Hughes discourses on "Vision and Vocation." The journal includes the transactions of the Institution and reviews. As the foreword observes, a scientific society without transactions is as imperfect as a man without a shadow, and we congratulate the journal on its renaissance.

DISEASES OF THE PITUITARY BODY.—Dr. O. Leyton writes that our reporter misunderstood his words at the meeting of the Royal Society of Medicine on Oct. 22nd (THE LANCET, Oct. 26th, p. 877). "I described," he says, "some observations which I had made years ago showing that the antidiuretic potency of an extract of pituitary gland did not depend upon its oxytocic content and then said these observations were confirmed by the separation of vasopressin and oxytocin. I did not claim that my observations had anything to do with the separation of these two bodies. I then went on to give evidence which I thought tended to prove that, although vasopressin controlled diuresis, nevertheless it was not the actual antidiuretic body. Of this I had not absolute proof because the observations were too few and a vital factor was the accuracy with which the vasopressin content in a solution was estimated."

ROYAL VICTORIA HOSPITAL, BELFAST.—Dr. J. E. MacIlwaine has resigned from his position of physician to the hospital; he has been elected a consulting physician with special charge of the electrocardiographic department. Dr. S. B. B. Campbell has been promoted to the rank of physician, and Dr. J. T. Lewis elected to the post of assistant physician thus rendered vacant.

THE LANCET.

LONDON: SATURDAY, NOVEMBER 9, 1929.

TANNIC ACID AND SECONDARY SHOCK.

HOSPITAL registers show for the last 25 years a striking reduction not only in the number of cases of burns admitted, but in the extent of the lesions, the mortality, and the ratio of children to adults. At the London Hospital, for example, admissions of burns in children under 12 have fallen from 150 in 1904 to 38 in1928 and the mortality percentage from 26·5 to 6·3. The decrease has been steady. Improved living conditions, the substitution of electricity for oil lamps and gas as a source of light, factory and workshop regulations, and the Children Act of 1908 have all contributed to the change. This Act, which makes it an offence to leave a child alone in a room with an open fire, has been effective beyond its immediate application by drawing the attention of parents to the gross dangers of burning and scalding accidents.

Most deaths from burns occur in the period of secondary shock. This manifests itself at a varied interval after the accident, usually on the second or third day, and is marked by the clinical picture of an acute toxæmia. The symptoms are now generally attributed to the absorption of toxins from damaged tissues; the toxins have not been isolated but are probably derived from lysis of the skin proteins. Excision of the whole damaged area therefore should have had, and has had, excellent results, but its limitations are obvious. Dr. E. C. DAVIDSON, of Detroit, therefore sought a means of fixing the toxins before their absorption. In 1925 he published a method of treating burned areas with an aqueous solution of tannic acid, thereby producing a dry brown scab which seems to imprison the toxins. Underneath the scab the reparative processes proceed naturally. Many of those in charge of hospital clinics in this country have adopted this method of treatment with enthusiasm, others have given it but lukewarm praise, while some have not tried it. In view of the important practical and theoretical considerations involved, the Medical Research Council invited Mr. W. C. WILSON, who is working in the department of surgery of the University of Edinburgh under Prof. D. P. D. WILKIE, to put together and publish the results of this mode of treatment obtained at the Royal Hospital for Sick Children, Edinburgh. His report was summarised in THE LANCET last week, and in our present issue we set out instructions for first-aid treatment by tannic acid. Mr. WILSON confirms the high claims made by Dr. DAVIDSON. His assurance that the mortality in hospital cases of children under 10 years has been reduced from 38·7 to 10·5 per cent. must be assessed in relation to the lowered mortality following burns in other hospitals; far more convincing is the statement that deaths during the period of secondary shock or acute toxæmia have fallen from 80 to 23 per cent. and that the area of skin involved, on which prognosis has usually been based, can be larger without danger to life if this treatment is followed. The involvement of 30 per cent. of the total body surface in adults, and of 11 or 12 per cent. in children under 10, has been regarded as almost certain to prove fatal. In Mr. WILSON'S series, 35 children were burnt to the extent of 12 per cent. or more of the body surface, and of these 27 recovered. These figures furnish strong evidence of the efficacy of tannic acid, and if we add the alleviation of pain and the escape from frequent dressings which the method provides we are surely in a position to welcome a notable advance in therapeutics. It would be interesting to have figures from other institutions in this country; the Edinburgh mortality figures appear to us exceptionally high. Hospitals in cities where the number of severe burns admitted is comparatively small may not yet have been stimulated to try the method. It is essential to remember that unless the technique is studied and applied in detail, the method is not likely to give the best results. All loose epithelium must be separated and the surface carefully cleaned, for the problem of sepsis, should it arise, is certainly not diminished by the tanned pellicle. Fomentations and other moist applications may not be used over the scab since they seem to liberate the toxins.

Although most suited for use in hospitals since it entails anæsthesia, thorough cleaning, hourly spraying till the tan forms, drying appliances, and protective cradles, this treatment may also have a wide scope where circumstances do not favour such a complicated technique. The provisional scheme of first-aid treatment drawn up by Mr. WILSON for use in mines and other places where burning injuries are not uncommon involves the use of compresses soaked in the tannic acid solution. The drawback may be sepsis, for it is noteworthy that in Mr. WILSON'S experience the deaths from this cause are not noticeably diminished. It is thus of prime importance that better prevention and control of infection should be attained and investigations in this direction are being pursued. There is no suggestion that tannic acid is an emergency measure of choice which should be kept in the home and used for the routine treatment of all burns. In fact, as Dr. D. A. COLES points out in our correspondence columns, for the present it is best used only under medical supervision. Small superficial burns of the first degree are likely to heal quicker when treated with some simple dressing than when exposed to the astringent action of tannic acid, while those of the second degree are no less likely to become septic. A safe rule at present is to attempt this treatment when the burn is severe enough for secondary shock to be anticipated, for there is ample evidence that the shock will be considerably diminished by its use.

THE LAW OF WATER-SUPPLY.

THE Advisory Committee on Water has just published[1] the Second Report of its Legislative Subcommittee. The First Report dealt with the law of underground water; the Second Report proposes detailed reform of the law of water-supply. More than 80 years ago Mr. BOOTH, Counsel to the Speaker, framed a series of Clauses Consolidation Acts, dealing with railways, companies, land acquisition, gasworks, and so on, which collected the sections most frequently recurring in local Acts, and thus, by making available a code for incorporation in the special Act governing an individual undertaking, brought great advantages of brevity and uniformity to local legislation. One Act of this series was the Waterworks Clauses Act of

[1] H.M. Stationery Office. Pp. 82. 9*d*.

1847, a general code which, though amended in 1863, hardly satisfies the needs of to-day. In inquiring into existing legislation the Subcommittee has closely examined this Act of 1847 and also the successive provisions of the Public Health Acts, the Model Bills and Clauses of the House of Lords, and the precedents introduced into local Acts on the initiative of progressive bodies. Everywhere the Subcommittee finds different powers and different procedure; it considers that the time has come for a fresh consolidation of the law, a new Waterworks Clauses Act for uniform incorporation by undertakers, and a general amending and equalising statute which will advance the position all along the line.

It was hardly to be expected that a code fashioned 80 years ago should keep pace with the growth of greater efficiency in water-supply and the extended requirements of modern sanitation. Thus among other anachronisms is the notion that baths and water-closets are exceptional luxuries outside the normal range of "domestic supplies" and justifying additional water charges. Parliament nowadays stipulates for the condition that no extra payment be demanded in respect of the first water-closet in a house. The Report proposes a definition of domestic supplies which will cover supplies for water-closets and for "baths of capacity not exceeding the prescribed number of gallons." Though the Subcommittee has drafted a permissive clause enabling the supply of water by meter for domestic purposes if the consumer so prefers, it does not recommend the compulsory metering of domestic supplies. Economy in the use of water may be an enemy of public health. Waste naturally affects finance. Gas companies (as CLIFFORD observed in his "History of Private Bill Legislation") have made better profits than water undertakings, although they sell an article which usually costs more to produce. But gas companies have the benefit of a metering system which checks waste and—charges not being based on rateable value—causes rich and poor alike to pay for what they consume. Metering might promote economy of water consumption in areas where shortage is possible, but there are other ways of preventing waste. Thus the Subcommittee advocates fuller provisions for penalising waste, misuse, or contamination of water, better powers of making and enforcing by-laws, closer attention to maintenance and repair of fittings, and the fixing of meters on service pipes and mains and stop-cocks on supply pipes. This last suggestion not only helps the detection of waste and the cutting off of supply where water is misused; it also avoids unnecessary disturbance of the roadway surface now so elaborately constructed and so heavily used by traffic. Another recommendation is that supply pipes under highways, connecting water mains with private premises, should no longer belong to private owners but should be handed over to the water undertaking with the liability for upkeep at the latter's expense. Further proposed reforms affect finance—e.g., the relation of reserve and contingency funds; some such revision of the law was carried out for gas undertakings last May. There is mention, too, of superannuation arrangements, the power to furnish or purchase bulk supplies and the need of ensuring proper construction of reservoirs. This last point, which recalls the Dolgarrog disaster of 1925, seems to be dealt with by the Government's new Reservoirs (Safety Provisions) Bill. It is recommended also that Section 70 of the Public Health Act of 1875 should be extended; at present the local authority can ask a court to order the closing of a well, tank, or cistern if the water is likely to be used for human consumption and is so polluted as to be injurious to health; it is advocated that the local authority be enabled to act without waiting for actual pollution to occur.

Other proposed reforms appear equally sound and deserving of support. One difficulty ahead is the devising of machinery whereby the new uniformity may be substituted for the old variety in the multitude of enactments governing individual undertakings. Undertakers will naturally be reluctant to incur the expense of a new local Act to bring each concern's position into line. Not anticipating serious opposition to the necessary changes, the Subcommittee advocates giving the Minister of Health power to alter the law in particular cases by departmental order. There are ample precedents for such a method, but the vigilance of Lord HEWART may hinder their extension.

THE LIFE OF FOOD.

SCIENTIFIC inquiry is a species of human activity which may be initiated by a variety of motives. Its pursuit is found to be peculiarly satisfying to the increasing numbers of men who devote their main energies to it, and for such men the very fact that they are endeavouring to increase the sum total of human knowledge may be a sufficient reward for their labours. Other less detached individuals may be no less anxious to inquire into the truth concerning the mechanism of natural phenomena, but prefer, or are compelled by circumstances, to select for solution problems which have a more or less direct bearing on the every-day life of the community. There is no essential distinction between these two classes of investigators. The fundamental principles enunciated by the former are frequently applied to practical inventions which may influence profoundly the life of humanity at large, while the attempts to solve some practical question affecting the ordinary life of man may often lead to the discovery of basic principles which are primarily of academic value.

A good illustration of this thesis is to be found in the annual review of the work of the Food Investigation Board.[1] The work is avowedly utilitarian, and is concerned essentially with devising means of storing and transporting food, so that it shall reach the consumer in the best possible condition with the minimum risk of wastage. The practical results already obtained are of very considerable economic importance, but, in addition, conclusions have been reached in certain directions which may prove of considerable significance in the realms of pure animal and plant physiology. Among the subjects of current investigation are the changes undergone by meat during freezing, cold storage, and thawing; important practical recommendations have already followed the work accomplished in this field. In the course of this work it has been found that there is a zone of low temperature within which lactic acid can still be produced, although the machinery for its destruction has been destroyed, an observation which may have an important bearing on the physiology of muscle contraction. The current methods of handling fish on trawling vessels have been the subject of special inquiries, and it has been found that without increasing the running costs of the vessels it is possible to extend the time during which fish can be landed in a fresh condition from 6–7 up to 10–11 days. Most interesting, perhaps, are the observations on the storage of fruit. Not many years have passed

[1] Report of the Food Investigation Board for the Year 1928. London: H.M. Stationery Office. 1929. 3s. 6d. Copies may be obtained in America from the British Library of Information, French Buildings, 5, East Forty-fifth-street, New York.

since the purchase of fruit in this country during the winter and spring months was almost impossible. Now there is a plentiful supply of apples, oranges, and tomatoes, not to mention other varieties, all the year round. The prices are often high, it is true, but this is in part owing to wastage occurring during storing and handling. It has been one of the tasks of the Board to investigate the causes of this wastage, an inquiry which has involved a study of the fundamental biological processes that occur in fruit during the various stages of its career. The conception of an apple (for instance) as a living structure that is continually respiring and producing measurable quantities of heat has been borne in mind; it has been shown that the apple, after passing through the phase of immaturity, reaches a period which has been called the climacteric, during which there is a marked increase in the rate of respiration, and an alteration in the respiratory quotient which are apparently associated with the production of those chemical substances which confer upon the fruit its characteristic flavour and aroma. This period is followed sooner or later by senescence, which must terminate the useful life of the apple as far as consumption by man is concerned. It is obviously desirable that the factors which control the time of appearance of the climacteric and the subsequent length of the useful life of the fruit should be determined, and with this end in view a large amount of work has been carried out on the influence of the state of maturity at the time of picking, and the temperature, humidity, and composition of the surrounding atmosphere during storage.

This work has not yet been completed, and is being carried on side by side with other important investigations concerning the influence of various types of fungal invasion on the metabolic processes of the apple. It is clear that results of vital importance have already been obtained by such investigation, and we may confidently look forward to a time in the near future when our supplies of food will be improved in regard both to quality and variety, and one may well hope, lowered in price as the result of the activities of the Food Investigation Board.

THE NOBEL PRIZEMEN.

EVERYONE will be glad that a Nobel prize—at any rate, half of one—has been awarded to Prof. Sir FREDERICK GOWLAND HOPKINS, if only because it gives us an opportunity of expressing our affectionate admiration of what he has done, and what he has been, and is, in English biochemistry. His laboratory career has been spattered with the results of his peculiar flair for seeing where the explanations of things lie; the pigments of white butterflies and a method of estimating uric acid are in the early years, the efficacy of milk as a food and glutathione (very frankly qualified the other day) are more mature products. And in between he has been the activating inspiration of a great number of young people. Their experience we envy, and it is not surprising that they flock so abundantly to the "Museum Hoppianum" in Tennis Court-road in Cambridge. HOPKINS did not, of course, "discover" vitamins; it is very doubtful, indeed, whether anyone really "discovers" anything in the ordinary sense; they put links into a chain. But the link which HOPKINS put into the process of finding out about the fat-soluble vitamins was important, and it came just at the right time, and it is, we suppose, with this particular activity of his in mind that the Nobel electors have joined with him Prof. CHRISTIAAN EIJKMAN of Utrecht who, a quarter of a century ago, made quite clear the connexion of beri-beri with diet through his convincing experiments with whole and decorticated rice in relation to the polyneuritis of birds. EIJKMAN, too, has not been a man of one idea. He has had a long career of fruitful activity in bacteriology, has devised good practical methods of growing the colon bacillus, and has involved himself in the philosophy of the theory of disinfection. Though "vitamins" is the obvious word which occurs to one's mind on reading the announcement in the papers, it is well to reflect how the many-sidedness of both men has given substance and comprehensiveness to their specialised investigations. And perhaps some of those who work at vitamins now would make better progress if they were not so exclusive in their interests.

Annotations.

"Ne quid nimis."

PARTNERSHIP IN INDUSTRIAL HEALTH.

A BRIEF account appears in another column of a social meeting in connexion with the Industrial Health Education Society. At the luncheon given by Lord Melchett to a representative group of persons directly or indirectly interested in the objects of the Society the need for explaining in detail what had been done and what was being done did not arise because so many in the room were familiar with what might have been said. But it is probable that such knowledge is not at all general or shared by many of the medical profession, who may not know what is the actual work of the Industrial Health Education Society. This Society, first, is the only voluntary society concerned with occupational disease, and its work is directed towards securing one great object—namely, the information of industrial workers as to the diseases and disabilities to which they in their particular trade are liable, so that, at any rate during working hours, certain perils may be avoided. The instruction is given in the form of health talks by medical men and dental surgeons, and on the invitation of the workers themselves—that is to say, the subjects of the health talks are chosen by the workers and the occasions for them are determined by the workers, the meetings being organised in their own clubs and canteens. In this way the presence is secured of workers who certainly would not usually assist at lectures on health where general questions of hygiene, environment, nutrition, and welfare were to be discussed. Yet these are the men who are deeply interested in a practical way in the incidence of occupational disease and accidents, and through the medium of the Society they are asking for instruction along definite lines, and they obtain it as much from the results of the cross-examination to which they are urged to submit the lecturer as from any set delivery of his. The fact that the initiative comes from the workers is of great importance, for the knowledge that the employers are not at the back of the lecturer removes a suspicion which has had malign influence in the United States, where the scientific management associated with the name of Frederick W. Taylor came to be regarded as a new form of oppression under the eponym of "Taylorism." The statistics which have appeared in the United States from many quarters, illustrating the increased efficiency of operatives who are maintained during their work in good health, have been collated with equally interesting figures as to the increased output from factories where sanitary environment is provided. The result has been that the cynical feeling has often been expressed across the Atlantic that the interest shown by employers in the hygienic conditions of the workshop may have its inspiration

in a commercial intent to get more work out of the men. This is an avenue of distrust which the words used at Lord Melchett's luncheon by the host, by Sir William Milligan, and by Mr. Ben Tillett should close. While the physical suffering is borne by the workers, they share also in the evils associated with trade depressions. The education in the factors of physical amelioration will enable the workers to demand from the employers conditions valuable to both parties, while the employers will have to obtain the knowledge which is being placed at the disposal of the employed, so that they may deal fairly with such demands. Put briefly, the health of the industrial workers is not a matter for parties at all, but for partners.

CEREBRAL INFECTION FROM THE NASAL CAVITIES.

IN 1926 the Minister of Health appointed a committee to inquire into the improvements possible in the process of vaccination. The committee, having examined the evidence, reported that in their opinion some light might be thrown on the nature and origin of the nervous complications by a knowledge of the channels by which infection might pass from the nasal cavities to the brain. Prof. le Gros Clark was therefore asked to investigate this problem, and the results of his work have now been published [1] in a pamphlet. Reviewing previous experiments, he points out that the injection of coloured dyes into dead subjects may easily lead to fallacious results, but a connexion between the subarachnoid space and the nasal cavity along the perineural spaces of the olfactory nerve has been repeatedly established. After experimenting with carbon suspension and trypan-blue, he came to the conclusion that the best material was a solution of potassium ferrocyanide and iron ammonium citrate in equal parts, made up to a strength of 1 per cent. This solution is practically isotonic with the body fluids. It was dropped, by Dr. Mervyn Gordon's technique, into the nasal cavity of rabbits and after the death of the animal the tissues were placed in 10 per cent. formalin, with 5 per cent. hydrochloric acid to precipitate granules of Prussian blue. These granules are not diffusible in the preserved tissues after death. When the mucous membrane of the nasal septum was dehydrated, cleared in xylol-phenol or oil of wintergreen and mounted in balsam, the olfactory nerve bundles were found to be strikingly outlined by a deposit of granules along the nerve-sheaths, strewn around in the intercellular spaces of the perineural sheath. Occasionally a few granules were seen in the substance of the bundles among the nerve-fibres, and often the individual sheaths were linked up by intercommunicating strands of blue granules running in among the follicles of the serous glands and forming a sort of plexus. The granules seemed to lie in the connective tissue spaces rather than in endothelial tubes, while the plexus connected up here and there with larger vessels in which the endothelial lining was distinctly visible. Few granules were found in the submucosa of the respiratory part of the mucous membrane, although a deposit of blue might be found on the surface. The sections provided abundant evidence that the solution had been absorbed into the submucous tissues through the olfactory mucous membrane and that absorption could occur within one hour of dropping the solution up the nose.

The granules showed a marked tendency to infiltrate the periosteum and perichondrium covering the turbinate system, and in the region of the cribriform plate there was convincing proof that they entered the cranial cavity. The subarachnoid space becomes continuous through the cribriform openings with the delicate trabecular sheaths of the olfactory nerves, and it was principally along this path—though also partly along the small blood-vessels and by extension along the periosteum—that granules made their way into the skull. The great absorptive property of the olfactory mucous membrane (contrasted with the poor permeability of the respiratory portion which absorbed very small amounts) is probably connected with the sense of smell. From the disposition of the granules it was reasonable to postulate a continuous stream of absorbed fluid passing centripetally along the nerve-fibres from the epithelium to the brain; a current must normally run in this direction. The absorbed solution is partly drained away by the ordinary lymphatic channels, but no evidence was obtained of a communication between the perineural sheath spaces and the lymphatics, or between the subarachnoid space and the nasal lymphatics. There was abundant evidence that the solution was absorbed into the blood capillaries and in a few cases conveyed by minute vessels through the cribriform plate; these vessels theoretically provide a route for pyogenic and thrombotic infections but cannot otherwise play a very important part in disease. Material can also pass to a certain extent into the cranial cavity, though not, of course, into the subarachnoid space, by penetrating the periosteum or perichondrium or passing through the bone of the ethmoid. Infection might thus spread to the extradural spaces. Goodpasture has suggested that the herpetic virus may reach the central nervous system via the axis cylinders of the olfactory nerves. This would depend probably on a peculiar affinity between a specific virus and the physico-chemical nature of the neurone, and was not considered susceptible to anatomical investigation.

While these experiments relate to rabbits, there is one case on record which suggests their applicability to human beings. A man suffering from epistaxis had his nose plugged with a tampon soaked in perchloride of iron. He died a few days later from meningitis, and at autopsy his olfactory bulbs were found to contain iron. The investigations provide an unimpeachable anatomical basis for the theory that certain droplet infections reaching the body through the nasal cavities can obtain direct and rapid access to the subarachnoid space. The brain has usually been regarded as a closed system, marvellously protected from the outer world. The news that fine granules can reach it, by a direct route, within an hour of their impact on the outside of the body offers a wide field for speculation.

[1] Reports on Public Health and Medical Subjects, No. 54. H.M. Stationery Office. 1929. Pp. 27. 1s.

HEALTH OF THE R.A.F.

IN his latest report[1] on the Health of the Royal Air Force, Air Vice-Marshal David Munro, the Director of Medical Services, is able to give a satisfactory account of the year 1928, and says that 88 per cent. of the officers called upon to fly were found fit for all flying duties. The average strength of the Force was 30,470 men and the admissions to hospital or sick quarters fell to 430·1 per 1000 (467·8 last year) with a considerable reduction in those for "sandfly, malaria, and influenza." Flying units have relatively fewer cases of disease, but of course, far more injuries than the others. Deaths from disease numbered 40 including 5 each from tubercle and enteric. As a result of injury there were 97, of which 65 (an increase of 13) were by flying casualties on duty. The relation of such casualties to the total hours flown is not mentioned this year. The chief causes of invaliding were psychoneurosis (28) and tubercle (22). A joint committee of the three Services has studied the incidence of tubercle, and a new table appears, showing that in the R.A.F. there was a relatively high incidence of tubercle before 25 and after 45 years of age, and between five and nine years' service. The prevalence of venereal disease slightly increased at home. Diphtheria cases were fewer; it is not stated whether this has any relation to the testing and immunisation of last year. Two kinds of influenza vaccine were tried among a total of 969 men; in both

[1] Report on Health of Royal Air Force during 1928. H.M. Stationery Office. 1929. 4s.

groups a third were later attacked by influenza, while in a control group of 1041 men the incidence was much the same. Dysentery on all stations abroad is mostly bacillary. Malaria has been reduced by a half during the year and for this reduction mosquito-proofing of barracks is given most thanks though Paris green is also mentioned. An interesting account is given of the difficulties of a force on active service in Iraq. In peace-time the great trouble in that country is to find amusement for the men in the evening to protect them from malaria and other diseases. Great attention is paid to hygiene in the training of the Force, and the orderlies, being themselves craftsmen, like all in the R.A.F., spend much of their spare time in making instructional models. Wounded and sick are now carried by air in service types of aircraft, not in flying ambulances, and this is found to be both comfortable and economical.

This report appears 11 months after the one for 1927.

BLOOD-GROUPS IN PUERPERAL AND NEONATAL DISORDERS.

THE blood of mother and fœtus may differ from one another in group constitution, and from time to time it has been suggested that an incompatibility in respect of iso-agglutinins and agglutinogens has some bearing upon disorders of the puerperium and of the first few days of life. In a series of 152 observations on mothers and their newly-born children, E. Bansillon,[1] of Lyons, found 36 cases in which the red cells of the child were agglutinated by the serum of the mother. In 20 (about 55 per cent.) of these the pregnancy had been characterised by severe vomiting beyond the third month, albuminuria, headache, and other so-called eclamptic symptoms. In a parallel series of 121 cases in which the maternal serum was incapable of agglutinating the fœtal red cells these symptoms only appeared in 16 (about 13 per cent.), though in one of them the symptoms were "graves avec eclampsisme." The converse case of agglutination of the maternal red cells by the fœtal serum was investigated with special reference to its possible relation to icterus neonatorum. In a series of 155 observations, 22 cases were found in which the fœtal serum was capable of agglutinating the maternal red cells. In 15 (or nearly 69 per cent.) of these the child showed marked jaundice during the first three days of life. Among 133 children whose serum was incapable of agglutinating the maternal red cells, icterus showed itself in only 10 (about 7 per cent.). Despite his suggestive findings, Bansillon remains sceptical about the possibility of a relationship between "eclampsisme" and incompatibility of maternal and fœtal blood. But at any rate he seems to have made out a case for further inquiry into the possible relationship between icterus neonatorum and agglutinability of the maternal red cells by the fœtal serum.

RECONSTRUCTION OF THE ROYAL VETERINARY COLLEGE.

THE importance to the State in an agricultural country of an efficient veterinary service is so obvious that it is not surprising that the Royal Veterinary College, four years after its foundation in 1791, became the recipient of a grant from Parliament of £1500 yearly. What is far more remarkable is the fact that after the year 1815 the grant was withdrawn, and that since then the College has been maintained only by donations and the relatively small sums represented by the fees of the students. The Development Fund gave a sum a few years ago for the erection of a Research Institute, and annual grants have been received from the Ministry of Agriculture and Fisheries for the maintenance of this department; but the school itself has meanwhile fallen into so serious a state of dilapidation that it is in danger of closure from lack of funds. It is scarcely a reasonable policy to encourage research while so vigorously discouraging the coming generation of research workers. Some of the educational buildings have already been condemned as unsafe, while the annual expenditure on repairs is a formidable drain on the straitened resources of the College. In the appeal for funds made three years ago by the Royal Veterinary College it was noted that in France and Germany the maintenance grants for the veterinary colleges in a single year before the war exceeded the total amount given by successive governments for veterinary education in England and Wales during the last 100 years.

In a recent report[1] on the Reconstruction of the Royal Veterinary College the Departmental Committee of the Ministry of Agriculture and Fisheries comment on the unselfish work, under deplorable conditions, of the members of the teaching staff and advises complete reconstruction and reorganisation as the only means of ensuring the continued existence of the College. The report deals comprehensively with the factors to be considered in the construction of the proposed new college, with special attention to site, accommodation, curriculum, staff, and government. The present buildings at Camden Town suffer from constriction and noise of traffic, but have the advantages of a central position and proximity to Islington Cattle Market, University College, and the London School of Tropical Hygiene. A town site, the committee consider, is preferable to a site in the country, since larger numbers of cases pass through the College for treatment, and though these are mainly cats and dogs and horses the experience of students in the treatment of farm animals can be supplemented by residence with practising veterinary surgeons and farmers during the vacation. It is doubtful whether a country site would command a greater number of farm animals than may be brought to a town clinic by motor ambulance, while a decrease in the numbers of small domestic animals would be inevitable. Familiarity with large numbers of sick animals is essential to the student, and can clearly be best obtained in towns. Another advantage of the present site lies in the fact that the College will probably become affiliated to the University of London, when the opportunities for recreation and social intercourse among the students would be much increased. It is proposed to provide for an annual entry of 75 students, including women, who were only admitted to the College in 1927—with total accommodation for 250; and to offer a four-year course, as at present, in preparation for the Diploma of the Royal College of Veterinary Surgeons. The report emphasises the desirability of a close connexion between the educational and the research departments of the institute, and the architectural construction of the new buildings would be designed to encourage this. A considerable increase in the staff is strongly advised with corresponding additions to equipment and maintenance; the new buildings are intended to provide ample laboratory and class-room accommodation with space for wards, operating theatres, and X ray apparatus. The estimated approximate cost of the new building, including equipment, is £280,000—or £300,000 if the freehold of the present site and certain neighbouring land can be obtained. The cost of maintaining the new College is estimated at £21,000 per annum, and an increase in the grant to the Research Institute from £5000 to £25,000 per annum is advised, with a view to providing a field station near London for experimental work on larger animals.

The response to the appeal for funds made by the governing body during the last three years has been disappointing, only £30,000 having been collected, and though the Treasury have sanctioned a grant of a sum not exceeding £35,000 for erecting new buildings, this grant is subject to the condition that the governors must provide an equal sum for every £1 received.

[1] Jour. de Méd. de Lyon, Oct. 5th, 1929, p. 637.

[1] London: H.M. Stationery Office. 1929. Pp. 26. 1s. 3d.

Even so the funds at present fall lamentably short of the advised outlay. Those who have had the opportunity of inspecting the magnificent veterinary institutes subsidised by the State in other parts of the Empire—for example, that organised at Onderstepoort, Pretoria, by Sir Arnold Theiler—will support the demand for an adequately equipped and staffed College in this country, where the lack of proper facilities for training reacts on the status of the veterinary surgeon.

AN ENGINEER ON INDIAN SANITATION.

IN tropical countries especially medicine has frequently to call in the aid of the engineer, and the views of an Indian sanitary engineer of outstanding experience are, therefore, of considerable interest to all medical men who practise in warm climates. Mr. G. Bransby Williams, formerly chief engineer of the Public Health Department of Bengal, has on two occasions addressed the Rotary Club of Calcutta on the subject of public health in India, and his last address, delivered in June of this year, contains a great deal to provoke thought. It is not difficult, in most parts of India, to produce vital statistics, which, from a European standpoint, are appalling, and Calcutta maintains an unenviable lead in this respect. The advantages of improved hygienic conditions may be worked out in terms of rupees, as well as of physical and moral advancement; this has been frequently done, and we need not elaborate that side of Mr. Williams's address, but other aspects are worthy of study. He begins by referring to the stupid as well as rather brutal attitude of a certain type of pseudo-philosopher, who turns down attempts at social and hygienic betterment, with the argument that to interfere in these matters is to disturb the balance of nature, and that as India is over-populated, it is unwise to take steps to lower the death-rate. It may be true, as David Harum held, that a moderate amount of fleas are good for a dog, inasmuch as they keep him from brooding over being a dog, but a laissez-faire attitude should not prevent us from trying to envisage an India which is not only more healthy, but better fed, better housed, better educated, and more generally prosperous than at present.

Mr. Williams tilts against official inertia in sanitary matters. He points out that the expenditure on water-supply, antimalarial measures, and public health generally in India is ridiculously small, and he adduces instances of gross neglect by responsible official bodies. The drainage outfall of Calcutta, it appears, is being allowed gradually to silt up, without any serious effort being made to keep it open. The neighbouring town of Howrah, with 200,000 inhabitants, has been permitted to develop on village lines, with no proper sanitation at all. Calcutta itself is growing increasingly unhealthy, as shown by the mortality figures, and it is to be feared that the same is true of some other large centres. On these and similar grounds Mr. Williams comes to his main thesis, which is that, as regards any serious improvement in the health of the inhabitants, the results of the British administration have been to a great extent a failure, no advance having been made comparable to that in Great Britain and other western countries. The fault, he admits, lies largely with local authorities, and unless a new atmosphere can be created, he believes that conditions are likely to get worse than better, with a further broadening of popular control. As a start he advocates the institution of large-scale experiments by public health and engineering authorities in specially insanitary areas, with a view to prophylaxis of disease.

There is, of course, another side to the picture which Mr. Williams draws. Small-pox has been definitely controlled, cholera has been checked in many of its worst manifestations, and the resources of modern science have been made available for anyone who has the initiative to use them in regard to malaria, tuberculosis, kala-azar, diphtheria, and other diseases. The path to general sanitary improvement has been indicated, and the influence of the British administration has always been exerted in favour of medical and public health reforms. More advanced communities, such as the Parsis of Bombay, have availed themselves largely of the opportunities provided, with immense profit to their section of the population. Large scale demonstrations of modern sanitation do exist in cantonments and the larger urban centres, and in some rural districts in the form of tea and rubber plantations, many of which are models of sanitary, as well as industrial, organisation. Such examples might with advantage be multiplied many times over, but the root of the whole question is, of course, education, not merely school and university education, but simple instruction in the homes of the people, and more particularly in the quarters of the women. In Gurgaon Mr. Brayne has shown what can be done by appropriate propaganda. "When you lose your way in Gurgaon district you find your way by your nose. The greater the stink the nearer the village. Even the animals clean their young, and do not foul their nests by insanitary habits. Why are Gurgaon villagers worse than animals?" By means of such simple home-truths has the deputy commissioner of Gurgaon appealed to his flock, who have shown themselves not devoid of humorous appreciation, and have responded in practical fashion.

A LABORATORY TEST FOR SMALL-POX.

DIAGNOSIS of the mild small-pox prevalent in this country is sometimes difficult, especially at the beginning of an epidemic when there have been no previous cases to make the practitioner suspicious. A laboratory test of proved diagnostic worth would be very useful in the diagnosis of atypical cases and therefore of great help in the control of epidemics.

In 1925 M. H. Gordon demonstrated that the virus of small-pox gave both specific complement fixation and flocculation with an antivariola serum. His evidence was convincing and its practical application is now forthcoming in a report[1] by Dr. W. L. Burgess, Dr. James Craigie, and Prof. W. J. Tulloch on the application of the flocculation test to the diagnosis of small-pox. The reaction is carried out with a suspension of the crusts from a suspected case and a specific flocculating serum prepared in the rabbit. The material was obtained from 93 cases coming from three different localities, Dundee, Arbroath, and South Shields. Fifty-three of these were cases of small-pox, which with one exception were of the mild type, and many of them presented considerable difficulty in clinical diagnosis. The remaining 40 constituted the control material and consisted of 11 cases of vaccinia (bovine 4, rabbit 5, human 2), 27 cases of chicken-pox, 1 case of impetigo, and 1 of septic rash. The results of the flocculation test were correlated with the clinical and epidemiological evidence, and the authors of the report conclude that the reaction is specific and of diagnostic value. In this they seem to be entirely justified and they are to be congratulated on an eminently satisfactory piece of work. But the importance of this investigation is not only a practical one, for it throws light on the mechanism of the immunity reactions of filtrable viruses. From his work with the viruses of vaccinia and variola Gordon claims that the immune reactions of bacteria and filtrable viruses are fundamentally the same and in this he does not stand alone. His position has been assailed, however, by certain investigators—notably Schultz and his co-workers in the United States and C. H. Andrewes in this country. Schultz and his colleagues fail to find any specificity in the complement-fixation and agglutination reactions obtained with viruses and their antisera, and they think that these reactions are attributable to contaminating bacteria present in the virus suspensions. Burgess, Craigie, and Tulloch have done control experiments with sera prepared against the bacteria found as contaminants

[1] Diagnostic Value of the "Vaccinia Variola" Flocculation Test. Medical Research Council Special Report Series, No. 143

in their virus material and their results do not support Schultz's contention.

This report is a valuable contribution to the literature of filtrable viruses and, as the Medical Research Council points out in the preface, it demonstrates the value of investigations carried out in the field by a medical officer of health in close coöperation with laboratory workers.

THE PREPARATION OF CATGUT.

CATGUT, to the preparation of which for surgical use the Medical Research Council have devoted a special report,[1] was certainly used by Galen for sutures, and, during the Middle Ages, by a number of surgeons; but it was not until the 'sixties of last century, when antiseptic surgery was devised by Lister, that it became an important material in surgical practice. It was then recognised that the elastic layer of the small intestine of sheep (for cat denotes not the source of the gut but the use to which it was first put, if it derives from an old word for fiddle) possessed many of the qualities which are desired for ligatures and sutures. First of these is a tensile strength commensurate with its gauge, a measure of elasticity, and the retention of these qualities for a long time. Its absorbability has a value which varies with the purpose to which it is put. Its great drawback is the difficulty of rendering it sterile, many of the methods which have been invented for the purpose having proved ineffective. From its place of origin catgut is obviously apt to be contaminated with many germs, some of which may be harmless while others may lead to serious infection. It is clear from the report that the large majority of the methods hitherto employed do not produce an absolutely aseptic gut, whether the test is made for germs naturally present in the gut or for specially virulent organisms introduced by intention. Nevertheless, it is a fact that surgeons have been able nearly always to obtain perfect results without any wound infection by the use of these methods, the tissues being capable of dealing effectively with a slight degree of infection, just as in pre-antiseptic days suppuration did not necessarily follow operation, even when unsterilised ligatures and sutures were buried. But at the present time no surgeon should be satisfied with suture material which can possibly contain living germs. The earliest attempt to destroy the organisms completely was made by Lister, who steeped catgut for some hours in a solution of carbolic acid, with perfect results from the surgical point of view; later he employed a mixture of dilute carbolic acid and olive oil; mercuric salts were soon substituted, and it will be news to many to learn that of these the biniodide is decidedly less powerful than the perchloride. Chromic acid was next tried, then various compounds of silver, turpentine, sundry essential oils, and other substances. Finally came iodine, which in one form or another has received the greatest measure of support. With nearly all these substances the test of efficiency was clinical; one and all produced a catgut which, in the great majority of operations, allowed the wound to heal without suppuration or any other sign of infection. The bacteriologist can, however, find infective germs in the gut every time. An essential difficulty in examining the claims of a particular antiseptic resides in the fact that, before the test can be applied, every trace of the chemical must be removed from the gut, for otherwise it may inhibit the growth of some germ which is actually present. No amount of washing with water will effect this, a point in which many investigators have failed. After an exhaustive survey the authors of the report give their adherence to iodine as a sterilising agent, combined with meticulous care at every stage of the process, from the earliest. If immersed for nine days in a solution of iodine of suitable strength at an early stage of preparation, catgut will absorb 12 per cent. of its own weight of oidine. If the iodine is in excess the gut becomes brittle, and it is necessary to remove some of it from the ligature after it has been sterilised. Flexibility is enhanced by adding glycerin to the iodine solution. All who prepare catgut ligatures and all who use them will need to pay attention to the conclusions reached in the report.

[1] See THE LANCET, Nov. 2nd, p. 946.

THE ADMINISTRATION OF NATIONAL RADIUM.

THE Radium Commission has decided, for the present, to recognise as national radium centres only such places as possess medical schools with complete clinical courses and the necessary facilities for instructing students and post-graduates in the principles and practice of radium therapy. In the view of the Commission, the need for more trained and qualified workers in the use of radium is even more urgent than the supply of radium itself. The Commission has further decided to initiate all negotiations for the constitution and equipment of national radium centres through the medical faculties of the local Universities concerned, and this procedure is now being followed. When the claims and requirements of these centres have been considered and assessed by the Commission, the allocation of national radium will be commenced. About 3 g. should be available for distribution, on loan, by the end of this year, and another 7 g. before the autumn of 1930. It is estimated by the Commission that practically all the radium which can be purchased by the Trust with the funds already subscribed will be required for the equipment of the national radium centres, and it is regarded as unlikely that any of this national radium will be available for allocation to other hospitals or institutions.

The radium for the "4-g. bomb" has been received from Belgium, measured and tested by the National Physical Laboratory, and handed over to the authorities of Westminster Hospital, where it has been installed. If, after three months, the radium is purchased, it will be entrusted for a further period of three years (at a rental of £410 per annum) to this hospital, which will maintain a continuous day and night service with the bomb, in the pursuit of certain clinical objectives prescribed by the Commission. A radon plant is to be installed at the National Physical Laboratory for the purpose of supplying radium emanation to institutions which otherwise could receive no direct assistance from the Commission in connexion with radium therapy. Questionaires relating to this service are being framed.

TUFFIER.

THE death in Paris last week of Sir Théodore Tuffier at the age of 72 years has removed from us one who upheld a great surgical tradition and who has been described in the *Siècle Médical* as worthy of the title "A Prince of Science." Tuffier had been for more than 40 years surgeon to Paris hospitals, but his name and fame were attached especially to the Hôpital Beaujon and the Hôpital de la Cité du Midi. There was hardly a province of surgery in which he did not do pioneer work; the development of spinal anæsthesia was perhaps the major interest of his life, with the surgery of the lung coming scarcely second. His published works on renal tuberculosis, on uterine fibroids, and on the treatment of inoperable cancer commanded general attention. He was a great traveller and was familiar at first hand with surgical practice all over the world. Conversely his own surgical clinic at the Cité became a centre of attraction for surgeons of all nationalities. Early in the Great War Tuffier was brought into intimate relations with the surgeons of the British Expeditionary Force, of which we have personal testimony from Sir George Makins, who was senior consulting surgeon to the Force. When at the suggestion of Mr. Lloyd George the Conférence Interalliée was instituted to discuss the methods of surgical treatment in favour amongst surgeons of the allied

armies, it was arranged that the meetings should take place in Paris, and Tuffier was elected president. Into the organisation of these meetings he entered with great enthusiasm and he made an effort to keep the work alive between the official meetings by monthly gatherings at his own house. There can be no doubt, Sir George Makins, writes, that these discussions had an important influence not only on the diffusion of experience gained in the different armies, but also on methods of treatment, hospital organisation, and the transport of patients. Tuffier himself was so impressed by the value of these international meetings that he made efforts to continue similar conferences after the war, and in fact the fifth of such meetings was held in London this year. Tuffier was an early and ardent adherent of the method of treatment of wounds devised by Carrel and Dakin, and speedily introduced it into the French hospitals. Always eager to adopt new ideas, he was the first surgeon to transport a patient by aeroplane, and thus brought a man wounded in the chest over the lines of the enemy to a base hospital in North Africa. A man of great personal charm, of high culture, a good linguist and conversationalist, Tuffier was also most hospitable. Many British surgeons in Paris during 1914–18 remember with pleasure visits to his home, where he had accumulated a wonderful collection of pictures and objects of vertu of all kinds. For over 25 years Tuffier was associated with the work of the Hertford British Hospital in Paris, first as surgeon and later as chairman of committee. The British Government recognised his services uring the war by creating him a Knight of the British Empire and a Companion of the Bath. His eminence as a surgeon had already been recognised by his colleagues by his election in 1913 as an honorary Fellow of the Royal College of Surgeons of England.

MEDICAL TREATMENT OF EXOPHTHALMIC GOITRE.

OF late years a mass of reports on the successful use of surgery in long series of cases of exophthalmic goitre has overshadowed other methods of dealing with this disease. But operative treatment, although it produces a certain benefit in a certain time, is admitted to be unsound at bottom, and we turn with interest to an account of the end-results of medical measures in 2000 cases studied during a period of 19 years, and now described by Israel Bram.[1] In this series care was taken to differentiate between, on the one hand, toxic adenoma with secondary Graves's disease, which was treated surgically, and, on the other, true Graves's disease, which was treated medically. The medical treatment was on the following lines. Rest was deemed important, but unless there were serious cardiac lesions the patient was allowed to get up for three hours in the morning and also in the afternoon. Special attention was paid to home environment, and when harmony was lacking sanatorium treatment was given. A properly equipped sanatorium, at a moderate altitude, where dietetic, sociological, psychological, and medical supervision can be suited to individual needs is next best, says Bram, to a congenial home. The diet was ample—about twice as much as for normal people—but low in animal protein. Drug treatment was mainly symptomatic; quinine salts, ovarian products, suprarenal cortex, and mild sedatives were found useful, whilst care was taken to avoid the use of thyroid extract, the opiates, iodides, and digitalis. Psychotherapy was regarded as a vital part of the treatment, and every effort was made to clear up conflicts of internal or external origin. The patients were discharged from active treatment in from 2 to 18 months, the average for all cases being 8 months. Those who were able to relax properly made much more rapid recovery than those who were weighed down with household or other duties. In 20 per cent. of the series surgical treatment had been resorted to months or years previously. Some of these had derived temporary benefit from partial thyroidectomy and others had not improved. It was found (contrary to general opinion) that post-operative cases with myxœdema tolerated thyroid extract almost as badly as those without any such signs of insufficiency, the only effect of the thyroid extract being to cause a flare-up of the still persisting symptoms of Graves's disease. The cases were followed for from three to ten years, and in recording the results the verdict of complete recovery was accorded to patients whose pulse-rate, basal metabolic rate, and weight were normal, who had no tremor, no exophthalmos, and no enlargement of the thyroid, and who had a feeling of perfect well-being and a normal endurance for social and economic purposes. It is stated that according to these criteria recovery took place in 91 per cent. of the 2000 cases, whilst 3 per cent. were completely cured but for slight persistence of the exophthalmos, 3 per cent. had residual enlargement of the heart without subjective symptoms, and 3 per cent. had signs of myxœdema with or without cardiac enlargement. The latter were cases in which thyroidectomy had been done months or years before regular medical treatment was started. Recurrence of the disease months or years after the patient was considered cured was unknown in the series, and Bram thinks that with treatment on these lines a patient "instructed in the art of relative simplicity of mental and physical existence" is unlikely to develop the disease again in later life. He holds that the main cause of failure in medical treatment is insufficient study of the individual as a whole, and the spirit of haste in which medical treatment is only too often carried out.

[1] Med. Jour. and Record, Sept. 4th, 1929, p. 248.

OUR MEDICAL LAUREATE.

Dr. Bridges, having appealed, in the words of Virgil, for the support of his adored Muses, testifies in this earnest difficult poem[1] to a life-long love of beauty, seeing that with the world's attainment of accumulated knowledge new orders of beauty arise; but a devotion to Greek culture compels him to regret that man's faculties have not developed in a comparable manner, so that there is "now no higher intellect to brighten the world than little Hellas own'd." The poet's deep religious feeling, however, and, wittingly or unwittingly, the humanism pertaining to his profession, lead him to point out the limitations to the Greek ideals. From this introduction the poet, in a second book, goes on to review the war history of the world, finding it an expression of the "Autarchy of Selfhood . . . by Reason denounced"; while in a third book he considers Breed, the second and "younger of the two arch-instincts of man's nature." Here medical knowledge is freely used in thought and word, and a similar ability to employ correctly the vocabulary and reasoning of the physiologist and the psychologist will be found in Ethick, the closing book.

We have here a religious appeal written in austere and beautiful language, with an effective disregard for the rules which used to govern the making of Alexandrines. Perhaps prosody as much as poetry lies without our proper sphere of criticism, but upon orthography we may express opinion. The approach to a simplified spelling employed by the poet in his text does not follow a logical pattern.

THE next session of the General Medical Council will begin at 2 P.M. on Tuesday, Nov. 26th, when Sir Donald MacAlister, the President, will take the chair and give an address.

THE Lloyd Roberts memorial lecture will be delivered at the Royal College of Physicians of London at 5 P.M. on Thursday next, Nov. 14th, by Mr. H. A. L. Fisher. The subject is An Oxford Movement.

[1] The Testament of Beauty. By Robert Bridges. Oxford The Clarendon Press. 1929. Pp. 192. 7s. 6d.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

LI.

THE INTERPRETATION OF TESTS OF STERILITY AND FERTILITY IN THE MALE.

UNTIL recently the only test to which the male has been subjected in cases of childlessness in marriage has been the examination of the semen for the presence of living spermatozoa. If these were found in what appeared to be reasonable numbers the result was considered satisfactory, and on the female partner in the marriage was placed the responsibility for the absence of children. But of recent years this method of dividing males into two classes of sterile and fertile has been found to be insufficient. It has been realised that a failure to conceive may be the result of a relative as opposed to an absolute sterility on the part of one or both of the partners in marriage. Even a minor degree of impairment of fertility in the male may, if he be united with an unfertile partner, become of supreme importance. Childlessness is, in fact, the result of the sum of the impaired fertility of husband and wife. This being so, a report on the husband should, if possible, furnish information as to his relative fertility, as well as the mere statement whether the semen contains active spermatozoa or not.

Examination of a Condom Specimen of Semen.

The quantity of semen emitted at a single coitus varies in different individuals, and at different times, and oligospermia is only of importance if of marked degree, and if it is known that a week's abstinence has been observed prior to the taking of the specimen. Oligospermia is physiological in old age. In a younger man it suggests suppression of prostatic secretion, and indicates the necessity for a careful examination of that organ. If in addition to oligospermia pus cells are found in the semen, an old-standing chronic prostatitis is a possible explanation. Finally, it should be borne in mind that the wearing of a rubber sheath may interfere with coitus in a nervous male and be responsible for the scanty emission. For this reason two or three specimens should be examined before oligospermia is reported.

Hæmospermia.

Hæmospermia suggests the presence of a chronic inflammation or congestion somewhere in the seminal tract, and more especially in the vesicles. It has also been found in cases of prostatic enlargement and in association with certain blood diseases, such as scurvy. If the blood is uniformly mixed with the semen, the vesicles are more likely to be implicated; if less completely mixed, the posterior urethra. In many cases of hæmospermia no lesion of the genital tract can be found, even after a searching examination.

Pyospermia.

The presence of pus points to an infection of the seminal tract. The same deductions may be made from the mixing of the pus in the semen as in the case of blood. In the presence of pus spermatozoa commonly lose their mobility and die. But the action of pus on the spermatozoa is very variable, and sometimes pus is found in the semen of fertile men. It is indeed probable that it is not the pus itself which is harmful, but that the pus is evidence of an inflammation which renders the secretions unfavourable to the life of the spermatozoa.

Necrozoöspermia.

The length of time that spermatozoa remain active and living after emission is affected by numerous factors. Some of these depend on the nature of the secretions surrounding the spermatozoa and some on the care taken to maintain the specimen at a uniform body temperature. The duration of life after emission may, however, be taken as a measure of the vitality of the spermatozoa. It can be studied by putting a drop on a slide under the microscope without any attempt being made to keep it warm, or else by placing the whole specimen in an incubator at body temperature and examining a drop from time to time. The presence of various types of deformed spermatozoa in a specimen is usually indicative of a hostile prostatic or vesicular fluid. If only dead spermatozoa are found at the first examination a fresher specimen should be obtained in order to discover whether the spermatozoa are dead at the time of ejaculation or whether they have died rapidly on account of unfavourable surroundings. The presence of blood, pus, and especially of micro-organisms in the semen, often explains a poor viability, especially if its reaction is found to be acid. In any case, necrozoöspermia is an indication for the need of a careful overhauling of the seminal tract for signs of inflammation.

Oligozoöspermia.

It is in richness in spermatozoa that the greatest number of variations are found when different specimens of semen are examined. Up till recently only large deviations from what was roughly considered the normal have been considered. Recently, however, Drs. Donald Comber and Morris Sanders have devised a method of spermatozoa counts, which expresses numerically the relative fertility of the male. These observers found that the average count in a healthy male is 100,000,000 spermatozoa per cubic centimetre. This figure remains fairly constant for the same individual at different emissions. It is diminished after sexual excesses or as the result of severe illness. It is lower in elderly men than in those still in their physical prime. As a general rule it is higher in those with large, well-developed testes than in those with small testes.

Anything that interferes with the formation of spermatozoa, or with their passage into the urethra, may produce an oligozoöspermia. The discovery of a low count in a young man should lead to a very careful examination, not only of the genital tract, but of the body as a whole. The testis is extraordinarily sensitive to changes elsewhere in the body, and treatment of any abnormality, be it a glandular defect or a septic focus, may have as a result an improvement in the spermatozoa count. The importance of oligozoöspermia as a factor in childlessness may be gauged by the fact that in only four of the 294 cases examined by the above quoted investigators did conception occur when the count was under 60,000,000.

Azoöspermia, or the complete absence of spermatozoa in the semen, may be explained either by a complete aspermatogenesis or else by a failure on the part of the spermatozoa to reach the urethra. The crucial test by means of which these two conditions may be distinguished is puncture of the testes and examination of the aspirated testicular fluid. This may be done under local anæsthesia. If no spermatozoa are found in the testicular fluid a search should be made for some constitutional defect, special attention being paid to the endocrine glands. If spermatozoa are found, the obstacle to their egress must be located by posterior urethroscopy and tests of patency of the ejaculatory ducts. This may be conveniently done by injecting a dye such as methylene-blue into the vasa at the neck of the scrotum and noting whether it appears in the urethra.

Statistics show that gonorrhœa is generally responsible for these cases of azoöspermia due to obstruction. Especially is this likely to follow bilateral epididymitis, as is shown by H. Benzer's observations on the after-history of German soldiers who had suffered from gonorrhœa and had been married for three or more years. He found that of those who had previously had unilateral epididymitis

23·4 per cent. were childless, and of those who had had bilateral trouble 41·7 per cent. In view of this risk of sterility it would be wise for all men who have suffered from bilateral epididymitis to submit a specimen of semen for examination before marriage. An azoöspermia of this nature is more likely than not to be incurable and a woman who marries a man in the hope that she may have children and discovers later that she can never be a mother may well have grounds for complaint if her husband, knowing the risk of sterility, has never submitted himself to examination. The same precautions should be advised where there is a history of epididymitis from other causes than gonorrhœa, or of orchitis following mumps.

General Consideration.

It must be remembered that in the case of the childless marriage multiple causes are the rule rather than the exception. The examination of the semen, therefore, although it is of great assistance in assessing the fertility of the male, is not the sole test to which he should be subjected. Constitutional factors that depress his fertility must be sought for. According to S. R. Meaken, the incidence of these constitutional faults is even greater in the male than than it is in the case of the female. Any examination, therefore, which helps us to assess the general physical health of a husband, for example a Wassermann, may be regarded as a test of fertility, although in this article only the examination of the semen has been considered.

KENNETH WALKER, F.R.C.S.,
Genito-urinary Surgeon to the Royal Northern Hospital and St. Paul's Hospital.

Special Articles.

REPORT ON AN OUTBREAK OF SICKNESS DUE TO CONTAMINATED MILK.

BY ARTHUR MASSEY, M.D., D.P.H. LEEDS,
DEPUTY MEDICAL OFFICER OF HEALTH, CITY OF LEEDS; HON. DEMONSTRATOR IN PUBLIC HEALTH, UNIVERSITY OF LEEDS.

THE outbreak occurred in the Roundhay and Moortown districts of Leeds on Sept. 30th last. There were involved 83 children, all of whom were under ten years of age. Of those affected, 78 were pupils at two elementary schools, A and B, in the city. The remaining 5 cases were children under school age of private families in receipt of milk from the same source as the two schools in question. The schools concerned, in common with the other Leeds elementary schools, receive a daily supply of milk in accordance with the scheme recently adopted by the Leeds Education Committee, which scheme commenced to operate on Sept. 9th last. Under the scheme, milk is provided to the schools by various purveyors according to district, and at the present time some 7000 gallons per diem are supplied in this way. One of the affected schools (A) receives 3 gallons, and the other (B) 1½ gallons per day. The milk is delivered to the schools each morning in capped bottles of one-third of a pint capacity, and straws are provided. The modus operandi is that the straw is thrust through a central thin portion of the cap and the milk is drunk through the straw. The milk supplied is non-graded and unpasteurised. The bulk quantity required under the scheme is such that much of the milk has perforce to be brought from without the city.

Source of Production.

At the time of the outbreak the affected schools were supplied with milk by a duly registered retail purveyor X, whose premises are situate within the city. The source of production was a farm outside the Leeds boundary occupied by Y. The milk was brought in churns from farm to dairy, bottled at the latter place, and finally delivered at the schools between 9 A.M. and 10 A.M. X had supplied the two schools in question (no others) since Sept. 16th, but it is to be noted that the day of the outbreak, the 30th, was the first on which milk from Y's farm was delivered at the schools. Prior to Sept. 29th, X had obtained his milk elsewhere, and there had been no untoward incident. On the 29th X obtained his first supply from Y. The day being Sunday, and the schools closed, the milk was delivered loose to private customers only. On Monday morning, before the school outbreak occurred, X learned that three young children on his round had the previous day suffered sickness which their parents attributed to the milk. The same day X delivered milk in bottles to the schools and loose to his private customers. There followed the school outbreak, and at least two cases of sickness in children on his private round.

On Sept. 30th at (A) school, 77 children partook of the milk; of these, as far as could be ascertained, 71 were affected, of whom it is certain 55 suffered severe vomiting. Six only of those who had taken milk were quite unaffected. None of the children who had not taken the milk was affected. At (B) school 39 children drank milk, 7 of whom suffered subsequent vomiting. At this school it was not possible to ascertain the number of children who drank milk and suffered consequent indisposition other than vomiting. Again there was no sickness among those who had not partaken of milk.

Characters of the Illness.

In both schools the milk was consumed at 11 A.M., and in the large majority of cases the sickness commenced about 1.30 P.M. Persistent vomiting was the most prominent feature, while mild diarrhœa and abdominal pain occurred in a few cases. Prostration was marked in isolated instances, necessitating the removal of the children from school to their homes by motor-car. The symptomatology indicated a condition of severe irritation in the upper alimentary tract.

On Oct. 1st the houses of 50 of the cases were visited by officers of the Leeds Public Health Department. It was elicited that, of these 50 children, 14 had stated that the milk tasted "funny" or "a bit sour," while all others had said that they had noticed nothing amiss. All concurred as to the normal appearance of the milk. Of the 50 cases, 6 commenced to be ill 2¼ hours after taking the milk, 39 2½ hours after, and 5 three hours after. According to the histories given by parents or children concerned, in 5 cases the illness lasted two hours, in 6 cases three hours, in 26 cases four hours, in 4 cases six hours, and in 9 cases seven hours. Howbeit all were fully recovered by the next morning. The comparatively short lapse of time between the ingestion of the milk and the appearance of symptoms suggested the action of a chemical poison, or of bacterial toxins already present in the milk at the time of consumption. The limited duration of the resultant illness was probably due largely to the rapid onset of severe vomiting which allowed of more or less prompt evacuation of the offending material.

Of the milk delivered to the affected schools on Sept. 30th all was consumed with the exception of the contents of one bottle. The available sample was divided into two parts, one of which was submitted for investigation to the Leeds city bacteriologist, and the other to the city analyst for chemical examination. The results of these inquiries are given below.

Conditions of Dairy and Farm.

The dairy through which the offending milk was supplied is a well-constructed brick building of 18 by 12 by 10 feet internal dimensions. The walls are of plaster and limewashed, the floor is of concrete, lighting and ventilation are adequate. Town's water is laid on. The sink is trapped and cut off, the waste-pipe discharging on to an outside gully. The dairy is fitted with a gas-heated hot water boiler for treat-

ment of bottles and utensils. The bottles for school milk are brought from the school about noon each day (there is no duplicate set). They are thereupon rinsed and placed in cold water to soak. They are subsequently washed and brushed out with hot water, rinsed in cold water, and finally placed neck downwards in suitable racks to drain and dry. There has been no actual sterilisation by boiling or by steam. No chemical is employed in the cleansing process. The dairy fittings and utensils were found in a satisfactorily clean condition, which is in accord with previous findings.

The farm, which constituted the source of supply of the milk in question, had been occupied by Y for some few months only. The farmer had but commenced to produce and sell milk on Sept. 29th, having purchased the necessary herd of cows within the previous week. He was not at the time registered with the appropriate local authority as a milk producer. The cowsheds at the farm are two in number, and both were found extremely dirty. The larger shed has recently been reconstructed, and in that respect is satisfactory. The smaller requires improvement in paving and lighting. The farmyard was dirty and muddy, but no manure was present. The water-supply is derived by pumping from a deep well, and the supply is described as abundant, and has since been found to be of good quality. There is no milk room and no cooler. The farmer stated that his practice was to stand the filled churns in a trough of water. The milk produced on the evening of Sept. 29th (that which was supplied, through X, to the schools on the following morning) was cooled in this primitive way. As far as could be ascertained, the churns, while so standing in the water trough, had had their lids properly in position. The churns seen at the farm were of the approved pattern. The churns and utensils are cleansed in the yard near the house by water from the well. It was ascertained that the cows were being fed on certain proprietary "dairy cakes." The farmer stated that all the cows had behaved normally with the exception of one which had arrived at the farm on Sept. 27th, and which had had slight diarrhœa which was promptly checked by modification of diet. The cows are milked by the farmer himself, with the assistance of one cowman. Both milkers were found to be in a healthy condition. It was apparent, however, that no precautions were taken by the milkers in regard to cleansing of hands and udders. The cows at the farm are 15 in number. They were duly examined on the morning of Oct. 1st, and the following are the chief points from the report of Mr. J. A. Dixon, the chief veterinary officer to the Leeds Corporation, viz.:—

Fifteen cows were examined, all of which were rather dirty about their udders and teats. The farmer stated that four of these cows had calved during the past week, whilst a further five had calved during the week before. The majority of the cows bear on their teats small scars, the sequelæ of variola. One red cow which calved about a fortnight ago still retains her fœtal membranes, and is discharging a purulent fluid per vulva. She is also affected with chronic suppurative mastitis in the right forequarter, and acute suppurative mastitis in the left forequarter, but her hind quarters are apparently healthy and the cow has a normal temperature. The farmer stated that the milk of this cow has not been put in the churns, but has been fed to the pigs since she calved. With these exceptions all the cows appear healthy.

In view of the conditions found at the farm, steps were taken to ensure an immediate cessation of the milk-supply therefrom into Leeds, until such time as an assurance was forthcoming from the appropriate county authority that the provisions of the Milk and Dairies Order with regard to the methods of production and handling had been complied with.

Bacteriological and Chemical Reports.

On Oct. 2nd Prof. J. W. McLeod, the Leeds city bacteriologist, reported on the sample of milk as follows:—

"Milk contained 23 million bacteria per c.cm. There are colon bacilli present in 1 100 c.cm., but these are masked by another bacterium which probably belongs to the coliform group, but has very slight fermentative activities. This last bacterium is the predominant micro-organism in the milk. It does not correspond to any of the known pathogenic types."

The result of the city analyst's (Mr. C. H. Manley) investigation, which came to hand on Oct. 3rd, reads as follows:—

Composition.

Non-fatty solids	9·12 per cent.	Ash	0·74 per cent.
Fat	4·10 ,,		
Total solids	13·22 ,,		

"The sample was uncurdled when received, and had not been heated. My examination has proved the absence of preservatives, metallic poisons and alkaloids. Tests were also made for tyrotoxicon (diazobenzol) with negative results. This substance, which may cause sickness and diarrhœa, is liable to be formed in milk and milk products in the summer time. The normal figure for the ash supports my findings as regards the absence of the non-volatile poisons. The chemical composition of the milk is distinctly above the average. With the observation of the proper precautions governing its production, this milk should compare extremely favourably with others on sale in the district."

Summary and Conclusions.

The outbreak of sickness, although of alarming extent, was short-lived, and complete recovery within 24 hours occurred in all the 83 cases.

Milk was the only common factor in the ætiology, and there can be no doubt that it was causative. The milk was found to contain no metallic poison, no alkaloids, no tyrotoxicon, and no preservative. It was rich in fat, due largely to the fact that it came from a herd of cows, nine of which had calved within the previous fortnight. There is no reason to believe, however, that the chemical composition of the milk was in any way responsible for the outbreak. The bacteriological investigation showed the milk to be grossly contaminated. The bacterial content proved remarkably high, which, per se, would render the milk injurious to young children. The predominating organism did not admit of classification according to known types. The evidence points to bacterial toxins in the milk as the cause of the sickness.

A survey of the evidence, in the attempt to decide between dairy and farm as the source of contamination, would appear to indicate the farm. The conditions there were quite unsatisfactory, and it is evident that the farmer in question took on a contract to supply milk before he was prepared as regards premises and equipment to produce under proper conditions. It is significant that the outbreak occurred on the very first day on which X supplied Y's milk to the schools. X had previously supplied the schools with bottled milk from another source without untoward result. The fact that five cases of sickness occurred in children of X's private customers, to whom the milk was delivered loose, would appear to exonerate the bottles and the process of bottling.

Briefly the outbreak appears to have owed its origin to the fortuitous circumstances of a farmer who supplied milk into the city before he was registered with his local authority, and consequently before the inspectorate concerned had had the opportunity of inspecting his premises and methods of production. Such a contingency is very unlikely to recur.

I tender my thanks to Prof. J. Johnstone Jervis, medical officer of health for Leeds, for permission to publish the above extracts from my official report.

PAYING PATIENTS AT READING.—A nursing home for paying patients has been opened in connexion with the Royal Berkshire Hospital at Reading. A large private house adjoining the hospital has been purchased and so adapted that the rooms occupied by patients look out upon timbered lawns. The home will accommodate 15 patients, eight in double-bedded rooms and seven in separate rooms. The stables have been converted into a massage department.

MENTAL HYGIENE.

CONFERENCE IN LONDON, OCT. 30TH–NOV. 2ND, 1929.

THE National Council of Mental Hygiene and the Tavistock-square Clinic, together with a large number of coöperating societies, organised a Conference on Mental Health, which was opened on Oct. 30th by Lord BRENTFORD. Messages were read from the Minister of Health, Mr. D. Lloyd George, and corresponding societies in many countries. We summarise here certain of the discussions with a direct bearing on medicine.

The Need for Enlightened Public Opinion.

Sir MAURICE CRAIG said that the mental hygiene movement was a layman's movement. To repair disease was a basic factor in medicine, but to live well and free from disease was something better. If we were to guide the child and the man along the path of health that permitted fulfilment of the purpose of life we must alter our conception of disease and ill-health. Something more fundamental than disease determined the way in which the individual would react to stress. It was essential for a man to know himself, and for physicians to have learned of those things that might vary disease and determine its permanent effect on the patient. The aims of the National Council were wide, for they covered life itself. Minor mental disturbances might be brought about in endless ways, and were usually a slow and progressive failure, of which the early stages were often overlooked or misunderstood. It was tragic to think that for the vast majority of patients nothing was done until mental disease had become serious and chronic.

Mr. LAURENCE BROCK (Chairman of the Board of Control) emphasised the necessity for an educated public opinion. The results of the great advance made in mental hospitals, he said, were yet not as good as they should be, because patients were not treated early enough. The general public did not realise that only two public mental hospitals in this country could accept patients before the stage of certification had been reached. Much could be done by the establishment of out-patient clinics to make the public realise that the mental institution was a hospital seeking to restore. The propaganda of voluntary organisations would make the public understand what could be done, and also educate them to a kindlier attitude towards the discharged patient. We needed a passionate belief in what might be accomplished by the best possible organisation and equipment.

Dr. LETITIA FAIRFIELD spoke of

Child Guidance.

Modern criminology and psychology, starting from wholly different aspects, she said, had united in demonstrating the importance for adult behaviour of childish habit-formation and impressions. The origins of the chronic neurotic and the old lag alike were likely to be found in a mismanaged childhood. Successful schemes of guidance would always depend on certain simple factors—e.g., thorough examination of the child and his environment, and coöperation with parents, teachers, and other persons in authority together with constructive plans for strengthening character and developing good habit-formation. Causes of maladjustment in any case were seldom single. It was possible to go much too far in condoning first offences and overlooking criminal tendencies in the young; guidance clinics would draw attention to the gravity of the tendencies, and correct them before irrevocable habits had been formed. The chief danger for the new movement was the enthusiasm of child-lovers, who thought it "all so simple," and believed that guidance clinics could be run on a little common sense. The work was extremely delicate and difficult, and needed highly trained experts with a background of exact scientific knowledge of psychology, mental disorders, and social service. Psychological work for children could never replace, but could only strengthen and assist, the old-fashioned guidance and discipline that the child must have from its parents; that had always been, and always would be, the best.

Canon T. W. PYM expressed his gratitude for the work of the Tavistock Clinic, and stressed the great importance of environment in mental hygiene, and the tragedy resulting from lack of early treatment. One of the great obstacles to early treatment, he said, was the special face and the special voice considered suitable when referring either to mental disorder or to sex. He pleaded for the view that sex was a gift of God, quite necessary and quite, quite ordinary, and for an equally sane attitude towards mental disorder. He urged the importance of educating the students who were to be the general practitioners of the future. The Christian minister, he said, was frequently groping in that shadowland where the apparently moral or spiritual difficulty was in truth largely mental, and he was for ever competing with the results of uninformed teaching on sex, of wrong upbringing at home—as often too kind as unkind—and of wrong education. The Church was not an ambulance; its gospel was a gospel of the development of man to his fullest capacity.

At a session on the subject of sex education the Chairman, Mr. W. H. FYFE (Headmaster of Christ's Hospital), spoke on

Sex Education in Public Schools for Boys.

While admitting that disastrous incidents might occur during school life, he thought that real tragedies were very rare. The sources of trouble were ignorance, exaggerated reticence, and the furtive, sniggering, and false attitude towards sex inculcated by certain cinemas and newspapers. It was fatal for the schoolmaster to set about giving information; imparted at the wrong time it might cause serious harm. The only cure was the "word in season," but that season was very difficult to find. It was always wrong to give more information than a boy required at the time. Physiological disquisitions would leave a boy as ignorant as before and even more pruriently curious. Almost the only people who could recognise the right moment were the parents, who had intimate knowledge of the boy and held his confidence. Most schools spread round themselves an atmosphere in which the vulgar attitude towards sex looked mean; the public school might be tainted by the world, but it stood on the opposite side from the flesh and the devil. Mr. Fyfe welcomed the modern frank discussion of all subjects; it enabled the master to talk freely to his older boys, without damaging that modesty which was Nature's guardian of sex, and to spread through his house an atmosphere of regarding sex as no nastier than electricity. The master could elicit romance on the side of health; at the time of puberty romance was always active just below the surface. He worked in a monastic life, where big boys quite inevitably fell in love with little ones—a natural, a fine and an idealising thing. The wise master admitted this, but pointed out to the elder boy how petting and spoiling would hamper the development of the younger, and called on his genuine affection, putting him in charge of the youngster he loved. In helping boys to develop themselves confidence was always right, even if misplaced. If a boy's sexual development went wrong, he obviously could not remain in the community, but he should be shown, and the other boys should be shown, that his position was comparable with that of some other boy who had had to leave because of a weak heart or a groggy leg; the trouble should be looked upon as a temporary derangement of the nervous system. The same attitude should be taken towards sex as towards digestion and excretion. The general average of all the influences brought to bear on boys raised the odds heavily against the chance of their getting through

puberty without a great deal of trouble, but during that stormy period they could be in many worse places than a boarding-school.

Miss GERALDINE COSTER (Headmistress of Wychwood School, Oxford) spoke on

Sex Instruction in Schools for Girls.

She had found of recent years, she said, that nearly all mothers agreed that girls should have some sex education, but many of them felt unable to give it themselves. For many reasons, education by the mother was the best, but the task required a high degree of skill and psychological insight. The over-conscientious mother who tried to answer questions, before they were asked produced indifferences, resentment, boredom, and forgetfulness. The child only wanted to know when it wanted to know, and not at any other time. A child was never shocked at sex information given when it wanted it, but was apt to be very seriously shocked when the instruction was given unsought. The casual mother who gave an irreducible minimum at puberty caused bewilderment, resentment, and adolescent neuroses. The scientific mother who thought that children would learn all they needed from breeding rabbits only stimulated curiosity, for children often failed to draw the analogy. The books and leaflets written for parents were usually far too sentimental and personal, and might outrage the child's sense of emotional integrity and reserve. One portentous and embarrassed interview was no good; there must be an attitude of such perfect frankness that the children would ask freely and spontaneously whenever they wanted; it was most important to make it easy for them to ask for further information at a future date. The difficulty of giving instruction at school was to secure this free inquiry. Instruction should not be given in class but individually, or to a pair of friends, if they were very young. It was not wise to suggest any problem which had not already worried the child, but the information given must be complete and explicit as far as it went, or phantasies would arise. The technique of the instructor was the one important matter; a sense of purity and cleanliness was conveyed by manner alone. If the instructor felt that sex was ugly the children would know it, say what she might. She must be absolutely matter-of-fact, and should not talk too much about beauty and holiness. The gêne always came from the adult; children were quite simple among themselves. It was absolutely futile to warn children against future dangers, but the school could and should inculcate a distaste for the clandestine, and a high standard of love and service, personal integrity and debt to the State. This was true sex education, as apart from sex instruction.

Mrs. C. NEVILLE ROLFE said that ignorance on matters of sex was at the root of some of our major social problems—e.g., venereal disease. The League of Nations "Reports Committee" had urged the necessity of changing the attitude of mind of the rising generation towards the problems of sex. It was useless to leave the education of children in the hands of ordinary adults, who lacked a scientific setting and suffered from the impingement of sex problems on their own lives. As tragi-comic examples she cited a mother who said in perplexity, "We gave Winnie a rabbit (*a* rabbit!) six months ago and she does not seem to have learned anything," and the university woman who started a chicken farm and mixed all the breeds together in the runs: "Oh, it's quite all right," she said, when questioned, "I always separate them at night." It was a terrible indictment of our education that such people could exist. Sex knowledge was only one part of the wider biological knowledge required by the citizens of any democracy; the practical problem was how to translate the small available scientific knowledge into popular teaching. We needed a national programme adapted to the different age-groups. The first thing was to give the teachers the right attitude of mind, which would disseminate itself unconsciously throughout the school. Even if the approach to sex had to be made at school, it was important to create in the home an atmosphere favourable to that approach; this might be done by parents' conferences. Information ought only to be given actually by those who had real knowledge, both of their subject and of young people.

Dr. CRICHTON MILLER spoke of the unconscious reluctance of the adult to let the child grow up and learn the secrets of adult experience—a very important, though unrecognised, factor. A good deal of parental influence was exerted on the ground that the parent wanted the child to grow up "with a strong character," but the capacity to resist self-indulgent impulses was not in itself evidence of strong character. A third source of parental error was the natural desire to "safeguard the child's future." It did not follow that the parent was qualified to convey the right feeling; the disillusioned could influence the young in no helpful way, and the frustrated had better keep quiet. The confusion and taboos and inner unresolved conflicts and prejudices of most adults made them impotent before a child's innocent and simple questions. The answer might be verbally correct and yet put across the wrong feeling. The greatest care must be taken not to intrude; constant watchfulness for the right moment was the only safe attitude. The child must be asked to exercise self-restraint on grounds as far as possible comprehensible to himself, and this positive basis could only be taught by the adult who had experienced as the reward of continence, partial or complete, an utter fruition of life in sex. True education in sex only began when the child's feeling was involved; the moment of his first gratifying sensory experience was a big crisis. Everything then depended on the ability of the parent to convey to the child real sympathy—real community of feeling. He should let the child know that these experiences had given pleasure to him also, and—properly treated—had led on to rich and noble experience. Into no one sentence could more parental mistakes be crammed than into the common phrase: "Mummie can't love her little boy if he does horrid things like that." Why "her" little boy? Why "little," when he had just had the first flash of that experience which should eventually make him a man? What right had she to label it "horrid"? And would she really cease to love him if he masturbated? Sexual malpractices averted because of threats did not contribute greatly to character growth. It was the duty of those who had found something sacramental in sex-life to pass it on to the children, free of taboos and fears.

At a discussion on the

Place of Mental Hygiene in Social and Public Health Work

the chair was taken by Sir GEORGE NEWMAN, who stressed the psychical factor in all physical disease and maintained that soundness of mind was the key to all human progress.

Dr. H. P. NEWSHOLME defined mental ill-health as failure of the individual to use his mental machinery with a degree of efficiency sufficient to maintain easy running for normal demands with a reserve for emergencies. Failure might arise through innate delicacy of the mental machinery, through laziness or insufficient attention to the machinery, or through excessive friction produced by the pressure of adverse external forces. He reviewed the mental machinery from the points of view of the physical apparatus, the mental cycle, and the phases of feeling, thinking, and acting. Full and exact response by the body would only follow on clear-cut thinking and understanding, and this only on full appreciation of the feelings. This demanded a momentary preoccupation with the feeling at its moment of impact, so that it was blurred to a minimal extent by the simultaneous impressions of other feelings. The nicety of an individual's adjustment of his incoming feeling was a matter of basic importance to his mental health. The pre-occupations of the past and the future, which lingered

too long, or appeared before they were due, were the old seven deadly sins, to which must be added fear. People should be taught the dangers inherent in indulgence in certain basic emotions. The same principle of unity applied to thinking: one thought at a time, and that a pure thought, uncoloured by desires or fears. Clear feeling and clear thinking must depend on good habit-formation in early life. This needed concentration and interest, regularity and persistence on the part of the mother, as well as constant watch against relapse. The will would be effectively exercised only through the stimulus of interest, which in the infant was largely vicarious and exercised on its behalf by the mother. Factors endangering the child's growing active interest were fear, lack of love, physical ill-health, fatigue, over-stimulation, and irregularity in household routine. These would distract from habit-formation, and give an appearance of irritability, indecision, and lack of purpose. Later in childhood arose the danger of excessive or too prolonged preoccupation with a habit once formed, so that the child was unwilling to pass on to the next. Preoccupation might occur in the unconscious mind as well as in the conscious if a feeling impinged on a mind unprepared to deal with it. The cure of unconscious preoccupation was the province of the psychiatrist, but its prevention lay in good habit-formation; the feeling had originally been put aside instead of faced, because of laziness or cowardice of mind. To avert the catastrophe, the individual must have an alert courage; its absence was a pointer suggesting dangerous weakness in the mental make-up. Preoccupation, conscious or unconscious, caused a poor response, with insensitiveness of feeling, flabbiness of thought and bodily tone, apathy, lack of decision, and lack of interest in the external world, save in matters related to the points producing the preoccupation; to these the individual yielded too strong and uncontrolled a response. This was an adverse factor in the mental health of those around him, as well as in his own. The key-words of mental health were interest, effort, regularity, concentration, and a capacity to terminate concentration, and intellectual and emotional honesty.

Miss HESTER VINEY spoke from the point of view of the public health nurse, than whom, she said, there was no more zealous, devoted, and effective champion of the cause of mental health. She was in a position to deal effectively with the educational side of this question. Miss Viney regarded the constant calling forth of fear as one of the most important causes of mental troubles, and suggested as constructive measures gardens and play enclosures free from noise and traffic, nursery schools, and safe balconies to all tenement rooms. The principles of mental health should be taught in season and out of season, as those of physical health had been taught.

A paper by Miss E. M. LAWRENCE (Chief Social Worker at the Child Guidance Clinic) was read in her absence. She dealt with the place of the social worker in mental hygiene, and remarked that to many people behaviour was causeless, and had to be taken as it came, and fought against blindly until their difficulties became so serious that some help must be sought. The kind of help they got was critical; the ill-advised went to all kinds of quacks and necromancers; the well-advised went to doctors, but did they always get what they ought to get, even there? The worst-served class were the borderline cases who remained in the community, competing with better people, and bound to be defeated.

The Child and the Parent.

The chair at this meeting was taken by Dr. CYRIL NORWOOD (Headmaster of Harrow), who observed that to become a parent was easy, but to get out of it without disgrace was difficult. The relationship between parent and child was largely one of give and take, and a great deal depended on the kind of parent and the kind of child; modern psychology tended always to blame the parent. He mentioned the great importance of the education of the child by other children.

The Rev. L. W. GRENSTED pleaded for greater leisure and quiet, without which the right parental relationship was impossible. We must simplify home life, and limitation of families might in many cases be the only way of securing full and adequate family life. The medical aspects of conception control had been well thought out; the theological aspects had been only too prominent, but the psychological—the most important aspect which would eventually turn the scale—had not received nearly enough attention. He pleaded also for the improvement of children's literature, although it was already much better than specimens like the "Fairchild Family." He referred to the desire of parents to keep their children for ever children, like the dreadful and ominous figure of Peter Pan, the most sinister form the mind of man had created.

Dr. HELEN BOYLE emphasised the value of training a child in adaptability, and the lack of necessity for perfection in parents. Many people, she said, wore themselves to fiddle-strings by trying to be resigned, when a little kicking would do a world of good. The enormous number of suicides suggested that we were not giving our children that faith that can move mountains. Training in adaptability could begin very early, and a healthy baby ought to be taught to sleep under any conditions of noise or light. Children were largely preoccupied by feeling their personal contacts with life and experimenting with happiness, and it was possible to safeguard them too much from the discoveries they ought to make. It did a healthy child no harm to over-eat itself and be sick, and the child thereby learned valuable lessons. A perfectly organised childhood did not produce an adaptable adult. "Of nothing too much" was a safe motto for the upbringing of children. Parents should strive for a large peace of mind; the child also made mistakes—often by trusting too much, becoming disillusioned, and then doubting too much—and most people thought much too badly of themselves, and then compensated by swelled head.

In the course of the subsequent discussion Sir MAURICE CRAIG maintained that the ability to sleep under disturbing conditions was an idiosyncrasy, and not merely a matter of training. He congratulated the Middlesex Hospital on its advance in ceasing to wake the patients at 5 A.M., and spoke of the appalling results of mixing big and small boys in dormitories, so that the youngsters were awakened when their elders went to bed. To those who advised "leaving it to Nature," he recommended a study of the garden left to Nature for six months. Dr. MARGARET LOWENFELD pleaded for more directed attention to play.

The Problem Child.

At this session the chair was taken by Dr. R. H. CROWLEY (Senior Medical Officer, Board of Education), who said that the child's life must be integrated in some way, and that a policy of coöperation between the home and the school was needed.

Miss E. M. NEVILL (Psychologist to the Children's House, Bow), distinguished three outstanding groups of problem children: disturbers of the peace, reality shirkers—the apathetic, timid, nervous and dreamy—and moral offenders. Adler had suggested three causes: that the child felt himself unloved, or inferior, or that he was spoilt. If with "unloved" one included "misunderstood," and with "inferior," "superior," this would cover most cases, but there was a difficult temperament to begin with, and certain illnesses might play a part. She gave examples of real children, showing how serious trouble might arise from very simple things which could have been easily settled by a little common sense. Much psychology was commonsense. She made a plea for the outstandingly clever child, for whom so little had been done; brilliant children were misfits, even more than dull children. The trouble should be discussed openly and frankly, without emotion, in order to find

the cause. The part of the father in the child's life must not be forgotten.

Dr. E. A. HAMILTON-PEARSON said that whether or not a child would become a problem child depended largely, if not wholly, upon its attitude to life, the product of its whole practical experience at any given moment. Attitude, moreover, determined almost exactly the experience of the immediately ensuing period; it caused the results of future experience to be similar to those of the past. Character was the outcome of recurring experience; therefore, if a child was to be able to form a strong character, it must start with a right attitude to life, and for this it must be able to learn right values for its thoughts and actions. An important environmental factor in the causation of wrong attitude was the lack of right, understanding discipline. Parents were too apt to allow children to make decisions for the making of which they had neither the data nor the mental apparatus for fear of repressing their personality. This was a chase after a false ideal; real freedom could only be a psychological state. Stable discipline implied complete freedom between known limits imposed for the good of the majority. The child produced by complete freedom of expression overvalued the importance of its own desires, and the restriction of school life bewildered it, so that often the seeds of neurosis were sown. The educational system created problem children by confining the eager, urgent, and turbulent interest of the young within a rigid and monotonous system, so that work came to be regarded as something unpleasing and to be avoided as much as possible. A rigid contrasting distinction between work and pleasure was a bad attitude for life. The educational system also created problem children by its adherence to a purely intellectual ideal in education. There were several types of mind, and each group of types required a different educational approach. Under the uniform system many children were committed to a dull routine, which daily emphasised their inferiority; they lost resolution, initiative, and confidence, and became the drifters in life. Adequately stimulated interests were the vitamins of the mind; if mental scurvy were to be prevented, the whole educational system must be recast. The refusal of the budding adolescent to grow up was becoming more and more common. Before the war there had been a sharp line between childhood, with its occasional treats and strict obedience, and adulthood with its relatively boundless freedom of action and conduct. It had been worth while to grow up. The average child of to-day had the same amusements as the average adult, and relatively greater freedom. Personally or vicariously—through the cinema—it experienced practically all that would be possible for it, and adulthood had few additional pleasures to offer in compensation for its greater responsibility. There was little in the conditions of modern industry to capture the imagination of a boy. Children who at this period became problem children nearly all suffered from atrophy of the sense of adventure, a sense which could be kept alive only if the child's lines of interest were kept clear.

INDUSTRIAL HEALTH EDUCATION SOCIETY.

A LUNCHEON was given by Lord Melchett at the Carlton Hotel on Thursday, Oct. 31st, to afford an opportunity to those interested in the objects of this Society to meet and to hear an exposition of the aims and position of the movement. Lord Melchett, who was supported by Sir Humphry Rolleston (hon. president of the Society), Lord Dawson of Penn, Sir John Rose Bradford, and Sir Arbuthnot Lane, in a brief speech welcomed a representative group of industrial employers and medical men. He pointed out that splendid work had already been done among industrial populations by the medical profession, but that much remained to be done owing to the fundamental ignorance of the bulk of the operatives and of no inconsiderable number of their employers. In regard to pit-head baths, he said, England, Wales, and Scotland were far behind the Continent and the United States, in which latter country the workman, after hours, was never seen in his work-soiled clothes, having had opportunity for washing and changing.

Sir William Milligan then described the great services rendered to public health by the Industrial Health Society, under whose auspices a number of indefatigable lecturers had submitted to varied and interested audiences the methods for the prevention and remedy of accidents incidental to their employment. The Society was formed in 1925, during which year 118 health-talks were delivered: in the following year the number increased to nearly 200, in 1927 to nearly 300, in 1928 to practically 400, while in the first three-quarters of the current year more than that number had already been given. He concluded by pointing out that the pecuniary resources of the Society had been strained to the utmost by the work which they had already undertaken and this at the time when openings for the development of that work were obvious. All the organisations of operatives in England, Wales, and Scotland had shown willingness to coöperate, recognising the obvious importance of the movement. He quoted figures to show that in 1928 the work of over half a million weeks was lost in England and Wales through sickness and invalidity, while the approved societies during that period paid out £15,000,000 in sickness and disablement benefits. While the Society, he said, had as yet made no appeal to the employers of labour for assistance, the time had come when it must be pointed out that more funds were required if the work was to go on, and he hoped that the whole movement would receive sympathetic consideration from those around him who directed important industrial businesses, and also from insurance companies.

Mr. Ben Tillett, M.P., proposed Lord Melchett's health in eloquent terms from personal knowledge of the chairman's qualities of leadership and generosity. He went on to point out that education on health matters in connexion with particular industries should be directed as much to the employers as to the employed, as the last thing the average employer thought about was the sanitary convenience and the necessities of human workers. He spoke as a non-party man, and with a real desire to see among the British an appreciation of the factor of efficiency in the matter of health. He held that the employing class had not considered with proper care the working of the finest machine they possessed—namely, that made by God Almighty.

Lord Melchett briefly replied.

GENERAL MEDICAL COUNCIL.

ELECTION OF TWO DIRECT REPRESENTATIVES FOR ENGLAND AND WALES.

Two names were selected last July by English and Welsh deputies at the annual meeting of the British Medical Association for nomination on behalf of the Association as Direct Representatives of the registered medical practitioners of England and Wales on the General Medical Council. These were Dr. H. B. Brackenbury, who has already served on the Council, and Mr. N. Bishop Harman. On their behalf the following election address has been circulated:—

We offer ourselves as candidates for election to the General Medical Council as direct representatives of the registered medical practitioners of England and Wales. One of us has been such a representative for the past five years and, as a member of the Education and Public Health Committees of the Council, has taken an intimate part in that review of medical education and of the needs of the public health service in which the Council has recently been engaged and which is not yet concluded.

We regard it as of great importance that advantage should be taken of the method of direct representation to secure the presence on the Council of additional members who have considerable experience of private practice (including special as well as general and insurance practice) in order that the conditions of such practice may be fully weighed in connexion with any disciplinary proceedings. In this regard, one of us has been in active general practice and insurance practice for many years, while the other, in addition to a long experience in private practice and as a member of a hospital staff, has held for a considerable period an important office in the School Medical Service of the London County Council. Both of us have been members of the Hospitals Committee of the British Medical Association and of the Insurance Acts Committee for a number of years, and so are familiar with those hospital problems which are so important at the present time and with the special conditions attached to insurance practice. Each of us has been, and is, in a position which brings him into contact with all varieties of medical practice and enables him to familiarise himself with general professional opinion; and we may claim in this way to be able to appreciate and to voice that opinion to an altogether exceptional degree.

In connexion with medical education it is important, we think, that the point of view of those who are the taught and the examined should be prominently considered along with the point of view of the teacher and examiner. The conditions of actual practice, general or special, are not always as prominent in the mind of the teacher as they well might be. The position of special branches of practice should not be lost sight of in prescribing the medical curriculum or in regulating training and examination—whether such special practice be followed exclusively or cultivated in association with a more general practice, especially perhaps in relation to extended or additional insurance benefits and to the clinical services of local authorities. In the administrative and legislative aspects of these matters as well as in their educational aspects, the position of the General Medical Council is one of increasing influence and importance. In our opinion such influence should be exercised in the direction of maintaining the best traditions and methods of private practice, and we claim that our familiarity with such administration and its problems will be a valuable qualification for such service as we may be able to render should our candidature be successful.

If opportunity should arise we should strongly advocate and support an increase in the number of direct representatives on the Council.

H. B. BRACKENBURY, LL.D., M.R.C.S., L.R.C.P.
N. BISHOP HARMAN, M.A., M.B., F.R.C.S.

As an independent candidate for one of the two vacant places, Dr. Arthur Haydon offers himself for election. His address is as follows:—

I offer myself as a candidate for election to the General Medical Council as a direct representative of the registered medical practitioners of England and Wales.

In 1911 I was a candidate for election to the General Medical Council, while in practice at Henrietta-street, W., and was fortunate in receiving 1000 votes, though I was not elected on that occasion. As a proof of my interest in education, I may say that I have been president and secretary of the Brussels University Medical Graduates Association for 21 years, during which time, I was in constant communication with candidates for the scientific degree all over the world. I have travelled, both professionally and otherwise, more than 65,000 miles in many parts of the world, and have studied medical practice in all climates and under all conditions. If within the province of the General Medical Council, taking the excellent example from the Dominions, I would recommend that a Bill might be promoted before Parliament to secure the complete abolition of unqualified practice, which is undermining legitimate medical practice, and making it nearly impossible for newcomers into the profession to make a living. If my candidature should be successful, it will be my endeavour to adopt a progressive policy, and to urge revision of the formula whereby medical practitioners are penalised for so-called infamous conduct in a professional sense, and perhaps to be able to modify any undue severity on the part of the General Medical Council in a disciplinary sentence on medical practitioners for trivial offences. I am not in favour of the nationalisation of hospitals. I should also be strongly in favour of an increase in the number of direct representatives on the Council, as I consider the number at present to be quite inadequate.

ARTHUR HAYDON, M.D., M.R.C.S., F.R.G.S.

CLATTERBRIDGE ISOLATION HOSPITAL.—A new wing of this hospital, erected under the auspices of the Wirral (Cheshire) Joint Hospital Board, has recently been opened. It contains a large ward for women and children, a smaller one for men, and two private wards, with a total of 22 beds.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some 1928 statistics of four cathedral cities, three boroughs, and one urban district:—

Name of district and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Ealing, B. (98,660)	14·9	10·5	0·77	1·49	1·3	1·9	41/22	—	5·5
York, C. (85,410)	18·1	11·7	0·99	1·27	1·7	2·2	59/28	23	4·4
Lincoln, C. (65,550)	14·8	12·3	1·11	1·50	1·9	2·3	58/33	23	3·1
Carlisle, C. (56,380)	19·6	13·0	1·08	1·48	1·6	2·0	73/46	22	0·9
Chester, C. (40,830)	17·0	11·2	0·95	1·44	2·0	1·9	59/24	34	7·1
Shrewsbury, B. (31,870)	16·9	12·3	0·78	1·50	1·5	3·0	56/32	22	3·6
Eccles, B. (45,200)	16·4	11·0	0·68	1·42	1·8	1·6	66/28	24	5·4
Billingham, U.D. (11,690)	24·1	10·7	0·68	0·85	2·8	1·2	89/—	25	10·6

The proportions of stillbirths notified per 100 live births, were: York, 2·6; Lincoln, 5·5; Carlisle, 4·8; Chester, 5·0; and Shrewsbury, 2·9.

Ealing.

Dr. Thomas Orr gives the population as 100,250 at the end of the year, after the inclusion of Northolt, when the area of the borough became 9135 acres and the density 11 persons per acre. The extension has brought many problems. The Greenford and Northolt wards get their water from the Rickmansworth and Uxbridge Company, and many new mains are needed. The rest of the area is supplied by the Metropolitan Water Board. The stream through Greenford, which caused a nuisance, is now reasonably pure. Many cesspools in the added area need abolition, involving the laying of new sewers. Of the five sewage works, two are efficient. A sludge-pressing plant is being installed at Hanwell, and chlorine treatment has kept in abeyance the nuisance from the Greenford works. Greenford and Northolt are scavenged by private contract, and are to be brought into the general scheme. New maternity and child welfare centres are being provided for the added area, and the latest school is to be of the Derbyshire type, a true open-air school, in which the class-rooms can be kept open in winter and summer, yet sheltered from the wind and adequately warmed.

Ealing applied to the Middlesex County Council for delegated powers for the supervision of maternity and nursing homes, but was refused, and the application is to be reconsidered by the Ministry under the Local Government Act, 1929. Successful proceedings were taken against a retail milk purveyor for trading without being registered, against a milk man for filling bottles not in registered premises, and against a retail milk purveyor for selling designated milk without a licence. Many dairy premises have been improved, and an incentive to this result has been provided by the greater interest taken by the public in the source of their milk-supply. Of 12 samples of ordinary milk, three were found to be tuberculous, and in two of the three cases the Middlesex County Council was successful in finding and condemning the offending cow. There were 68

notifications of diphtheria, with a 10 per cent. case fatality, and Dr. Orr comments on the delay in using antitoxin. There were 12 cases of typhoid fever, with four deaths, and 14 cases of puerperal fever and pyrexia, with two deaths. Dr. Edna Langston has been appointed to investigate maternal deaths from childbirth as desired by the Ministry. The percentage of school "leavers" with sound teeth has increased from about 36 in 1915–16 to 67 in 1927–28. By routine and special inspections, 27 children with organic, and 87 with functional heart disease were discovered, and will be specially supervised.

York.

Dr. P. R. McNaught says York is not described as an industrial town, but that in addition to being an ecclesiastical and military centre, it is an important railway centre, employs about 10 per cent. of those engaged in the cocoa, chocolate, and confectionery industry, and has beet-sugar works. None of the industries is thought to be harmful to health. There are many voluntary health societies. The diocesan home for unmarried mothers admitted 23 expectant mothers, and 27 mothers with infants, and receives a grant of £100 from the corporation. In the case of the seven maternal deaths, investigation revealed that delivery was spontaneous in four cases and by Cæsarean section in one, and that in two cases delivery did not take place, one dying from cardiac failure and the other from hæmorrhage and placenta prævia. Of 45 neonatal deaths investigated 32 were attributed to prematurity, 2 to syphilis, and 3 were "born before arrival." There appears to be no orthopædic scheme, but arrangements have been made for the admission of crippled children to the Yorkshire hospital at Kirbymoorside. There is a shortage of houses, and 1600 applicants are on the waiting-list for houses on the Tang Hall estate, where the corporation have built 1272 houses, and had 210 more in course of erection at the end of the year. One unhealthy area with a population of 805 is being dealt with, and about 750 houses are waiting for demolition or renovation when the shortage is relieved. The York House Improvement Society has been formed for the purpose of purchasing houses in need of repair, renovating them, and letting them at weekly rentals of from 3*s.* 6*d.* to 6*s.* 6*d.*, with collection and management on Octavia Hill lines. Another voluntary committee, "Tuberculosis Crusade," in its 1928 report (included), considers the housing problem the greatest barrier to their progress, and that for the great mass of slum-dwellers post-war Housing Acts have accomplished nothing. They favour the "children's rental allowance system" recommended by Mr. E. D. Simon. Out of 57 samples of milk examined, five were found to contain tubercle bacilli.

Lincoln.

Dr. D. C. Lamont, who took over the duties on June 18th, states that the small-pox epidemic, which began in November, 1927, and accounted for 71 cases in that year continued until June, 1928, causing 107 additional cases. There were no deaths. The notifications of diphtheria, 133, were higher than in any of the previous 16 years. There were seven deaths, and Dr. Lamont, in recommending an immunisation scheme, mentions that the Paris Education Authority has taken this up energetically, with the result that 47,000 children were inoculated there in the second half of 1928. The new isolation block of 10 beds, built on the cubicle system, has proved a success, and at one time housed seven different diseases. The orthopædic scheme of the Education Committee began in June, 1928, and was extended at the end of the year to include children under five years and tuberculous cripples of any age. The total births numbered 980. The antenatal clinic was attended by 402 expectant mothers, of whom 227 had booked for the maternity home and 175 had engaged a municipal district midwife. A fourth municipal midwife is to be appointed. There are only two midwives in private practice in Lincoln, one of whom is a "bona fide," and the other only acts as a maternity nurse. Systematic antenatal supervision by the municipal midwives has, to a large extent, abolished the unwillingness of mothers to undergo examination during pregnancy. A nuisance has arisen owing to the discharge of excreta from house-boats into the rivers and dykes, the current being very sluggish, and endeavours are being made to combat it. A voluntary slum clearance committee has been formed with the object of providing low-rented houses for necessitous tenants. The immediate aim is to subsidise 100 houses with £70 each, and to let them at 6*s.* 6*d.* per week, inclusive of rates. The inclusive rental of municipal houses is 15*s.* 4½*d.* for the parlour, and 13*s.* 2*d.* for the non-parlour type.

Carlisle.

Dr. Joseph Beard reports that 29 samples of fresh cow's milk were examined for tubercle, that two were found positive, and that as a result the veterinary inspector of the Cumberland County Council eliminated two milch cows from herds in his area. The corporation maintains a well-equipped slaughter-house. Meat stalls are only permitted in the covered public market, and all butchers' shops are fitted with windows. Dr. Beard complains that, in too many instances, patients are not notified as suffering from tuberculosis of the lungs until, frequently as the result of repeated bacteriological examinations, tubercle bacilli are found in the sputum. The births numbered 1109, and 174 confinements took place in the municipal maternity home. This home has now trained 24 pupil midwives, and all of them passed the C.M.B. examination at the first attempt. The antenatal clinic was attended by 201 expectant mothers. Of the 122 infant deaths, 51 occurred before the age of one month, 42 before the age of one week, and 29 before the end of one day. Dr. Beard expresses his disappointment at this result, seeing that in 1927 Carlisle won third prize among the towns with populations from 50,000 to 100,000 in a competition as to the greatest reduction achieved in neonatal mortality. Thus, in 1927 6 children died in the first day, 14 in the first week, and 25 in the first month, whilst the figures for 1928 were 29, 42, and 51 respectively. For a long time statistics have been kept as to the aid to survival of breast-feeding as compared with bottle-feeding. A table shows that in 1928 the mortality-rate per 1000 of 754 breast-fed infants was 25, and of 195 bottle-fed infants was 56, but also gives the curious result that the mortality-rate of 123 infants, partly breast- and partly bottle-fed, was 81. The lessening mortality among bottle-fed infants yearly indicates increased skill on the part of the mothers. Forty-two debilitated infants, who were practically unable to be fed (presumably those who died in the first week), were not put in any of the classes mentioned. The clearing of one slum area and the rehousing of the tenants is in progress. Forty-one of the evicted tenants were induced to take new corporation houses, while 13 others secured better houses by conceding their claim to a new house to other householders.

Chester.

Dr. D. Rennet reports that the maternity hospital is a voluntary institution, and that the corporation paid for 10 of the 120 city patients admitted to it during the year. The hospital also admits patients from outside the city, and has an extensive extern department and an antenatal clinic, which was attended in 1928 by 152 expectant mothers. Dr. Rennet emphasises the need for institutional treatment for mental defectives, and hopes that progress will now be made with the scheme of the Cheshire joint board. The chlorination of the water-supply, begun in the last months of 1927, appears to be satisfactory, but Dr. Rennet hopes the water company will provide more sedimentation and storage accommodation. During 1928 39 patients were treated at the ultra-violet ray clinic. Rapid and very evident

improvement is claimed in debility and early rickets, considerable benefit in some forms of non-pulmonary tuberculosis, but only qualified improvement in lupus.

The new municipal houses numbered 141 and private enterprise completed 35. Closing orders were made for 28 houses, so that the net gain of new houses was 148. The dairy herds are inspected by the veterinary officer but only twice a year. As the result of 17 biological examinations, one tuberculous cow was found and another was discovered by microscopical examination of the milk. The public analyst reports that the milk fat in eight samples of ice-cream examined varied from 1 per cent. to 14 per cent., and suggests a standard of 12 per cent. as reasonable.

Shrewsbury.

Dr. A. D. Symons expresses his emphatic approval of the new health department premises. He gives an interesting quotation from the report of 1878, in which the medical officer expresses the opinion that with its advantages Shrewsbury might attain a rate of 16 per thousand, but thought an average a little over 17 more within the bounds of probability. In 1878 there were 250 cases of typhoid fever with 20 deaths, and the then medical officer was right in believing this "to be absolutely and completely removable." Dr. Symons thinks his predecessor would be surprised to learn that in 1928 the birth-rate was 16·9, the death-rate 12·3, and the infant mortality-rate 56, as compared with a birth-rate of 32·2, a death-rate of 22·2, and an infant mortality-rate of 140, in the year of which he wrote. The infant mortality-rate of 1928 was increased in comparison with the previous year (43) largely owing to an unusual number of twin births. There were 13 sets of twins amongst the 552 births. In the five preceding years the sets of twins numbered 4, 6, 7, 2, and 4, respectively, and of the 31 infant deaths in 1928, 8 were those of twin babies. Dr. Symons, after investigation, divides the 31 infant deaths into 8 unpreventable, 13 possibly preventable, and 10 preventable, and sees no reason why the rate of Shrewsbury should not be between 20 and 30, even with our present knowledge. The dual system of water-supply, consisting of drinking water supplied by means of self-closing water pillars in the streets and treated river water laid on in the houses for domestic purposes, has given no anxiety as regards quantity or quality during the year. Hitherto, in the housing schemes preference has been given to tenants (*a*) who had children, or (*b*) who could afford the rent. The majority of those selected respond to the uplift, but there are many who fail to carry out their agreement, and who show that they are incapable of, or indifferent to, cleanliness and better habits. Dr. Symons thinks it is unfair to rehouse bad tenants next door to good ones, and his remedy is a separate colony, managed on Octavia Hill lines, from which families who showed a desire to rise could be ultimately transferred to a different housing estate.

Eccles.

Dr. J. E. Spence reports that measles and whooping-cough were both epidemic during the year. During the past 15 years the mortality from these two diseases has been more than three times as great as that from scarlet fever and diphtheria combined. Measles has been notifiable in Eccles since 1920 and whooping-cough since 1924, so that it is now possible to give figures for the case fatality of these diseases. During the first year of life 1 patient out of every 21 dies from whooping-cough and 1 out of every 31 from measles. During the second year 1 out of 36 dies from whooping-cough and 1 out of 35 from measles. During the third year 1 out of 43 dies from whooping-cough and 1 out of 38 from measles. After three years old the fatality of these diseases becomes almost negligible, as at all ages over three 1 out of 880 patients dies from whooping-cough and 1 out of 396 from measles. If these facts could be brought home to parents, says Dr. Spence, the fatalistic attitude might be abandoned, and a greater effort made to protect the younger children from infection. Out of 12 samples of milk examined two were found to be tuberculous. The first came from a borough farm. All the cows were examined by the veterinary surgeon. A sample of milk was taken from a suspicious cow, and the remainder were divided into four groups of five for sampling purposes. The separate sample proved negative. One of the four groups gave a positive result, but a cow from this group was sold shortly after the original sample was taken, and the milk from the remaining four proved negative. Doubtless the cow sold was the offender. The first sample was taken on August 14th, and on Oct. 24th six pigs from this dairy farm which had been fed on skimmed milk were found at one of the slaughter-houses to have tuberculosis of the mesenteric glands and liver. Dr. Spence cites this as an effective demonstration of the risk which young children run. After a demonstration of the use of a solid smokeless fuel in the public health offices, the trader, who held the local agency, found that the demand exceeded the supply. This fuel is also being tested for the heating of the public central library.

Billingham.

Dr. T. J. Kirk submits the report for this rapidly growing industrial town, which is being tacked on to the Durham village of Billingham and the older district of Port Clarence. The new houses in 1928 numbered 502. The staff of district nurses has been increased and the two child welfare clinics are well attended. Other problems are being energetically tackled. For example, the privies at Port Clarence are being converted to w.c.'s, the collection of refuse and tipping methods are being reorganised, and the "Bendy," a large sheet of filthy stagnant water, has been abolished by drainage and filling in with clean earth. The three butchers have adopted the Cash captive bolt pistol. The main problem of the district, however, is atmospheric pollution, rather than smoke abatement, owing to the emission of dust and grit by three of the most important works in the area. Synthetic Ammonia and Nitrates, Ltd., cause a serious nuisance by the emission of fine grit and dust from their method of steam raising by pulverised coal. It is hoped that the fitting of water sprays into the chimney stacks may be an effective remedy. Casebourne's Cement Co., Ltd., give off a fine yellowish-grey powder, which, under certain weather conditions, covers the whole of the property within a considerable area. An experimental dust arrester proved a failure, but further experiments are in progress. The nuisance caused by the North Tees Power Co. is a much smaller evil and more local, and affects fewer dwelling-houses. In this case steam is raised on the chain grate system, and grit is only emitted at intervals, when soot-blowing is in operation. One dust arrester has been fixed by this company, and it is expected that a similar apparatus will be fixed to each chimney stack. Finally, it can be said that all the firms mentioned are making every effort to find a complete solution to their respective problems.

MENTAL HOSPITAL REPORTS.

THERE were 900 patients in the *Dorset Mental Hospital* on Dec. 31st, 1928, an increase of 20 during the year, and there is still danger of overcrowding. A scheme is under consideration to hand over the north male block to the female side, and to build a new dormitory on to the old recreation hall to provide additional accommodation for the men. The recovery-rate was 39·56 per cent. and the death-rate 5·68 per cent. Apart from six patients suffering from phthisis, and six women known to be carriers of typhoid, the patients had extremely good health and suffered from no epidemics. A dentist visited fortnightly and saw 372 patients. A dormitory is to be enlarged in order to free a room for handicrafts, and an instructress from the Occupation Therapy Association has initiated the work by giving a course to patients and staff. Two male wards are administered on the open-door system, and 84 men and three

women are allowed on parole beyond the estate. The laboratory is well equipped, and research is carried on as well as extensive routine investigations. The number of examinations at the bedside and in the laboratory reached 2425 during the year. The discovery of a hydatid cyst of the liver infected with the typhoid bacillus led to a routine search for typhoid carriers by the method of Wilson and Clair. The Meinicke micro-reaction has been carried out on all new admissions, but has not been found to parallel the Wassermann reaction closely enough for it to be relied upon. A leucocyte study is being continued, and the importance of frequent systematic leucocyte examination in mental disease is emphasised in the report. Buscaino's black reaction is done as a routine, and its relationship to Scheiner's reaction is to be worked out. The colloidal reaction of Takata-Ara is being investigated. Patients with general paralysis are treated with tryparsamide; three out of nine developed a negative or weakly positive Wassermann reaction. The out-patient clinic is held weekly at the Dorset County Hospital. Five nurses and two attendants passed the final R.M.P.A. examination, so that about one-third of the nursing staff are now certificated or registered.

The *City of Leicester Mental Hospital* at *West Humberstone* had 955 patients on its books on March 31st last. The recovery-rate was 53·64 per cent. and the death-rate 5·38 per cent. Cause of death was verified by autopsy in 92 per cent. of cases. A systematic investigation revealed two typhoid carriers, one of which has cleared up under treatment, while the other remains a source of infection. General paralytics are being received from a neighbouring mental hospital for malarial treatment, and ten cases have had pyrexial attacks induced during the year. There was one death unassociated with malaria, three patients were slightly improved, and three were discharged. Leave of absence was granted 2448 times to men, and 1250 times to women during the year, and the number of week-ends allowed has increased. Of the male patients 53 per cent., and of the female 37 per cent. are on full or limited parole; 14 men on parole escaped during the year. Useful employment was found for 77 per cent. of the patients. Cinematograph entertainments are given regularly in the hospital, and small parties of women go regularly to local cinemas and for motor drives. The routine work of the laboratory continues to increase. A small outbreak and a couple of isolated cases of Sonne's dysentery occurred during the year, but responded readily to treatment. The visiting dentist inspected all new cases and 91 old inmates, and performed 339 operations. A new nurses' home is proposed, and the old superintendent's house has been adapted as a unit for 332 women patients. A Vermes photometer has been installed. Two nurses obtained the qualifications of the General Nursing Council.

The *Stafford Mental Hospital* had 1022 patients in residence on Dec. 31st, 1928, an increase of 19, despite the removal of 30 men to the East Riding Mental Hospital. There was a deficiency of 73 beds, although the isolation hospital, with 20 beds, is still occupied by male convalescents. The new reception hospital, now being built, will relieve but will not cure the situation. The recovery-rate was 25·69 per cent. and the death-rate 6·36 per cent. Autopsies were held in every case where permission was given. Sixty-three patients were allowed out on trial before discharge, but only one was given money allowance. Two men have parole beyond the estate, and 33 men and two women are free within the grounds. One ward on each side and the male convalescent block are administered on the open-door principle. There are 11 male and eight female patients suffering from tuberculosis, but there has been no epidemic disease. Forty-eight attendants and eight nurses are certificated or registered. At *Burntwood*, the second of the three Staffordshire mental hospitals, there were 924 patients on Dec. 31st, 1928, a decrease of 19, which is almost entirely due to transfers of men under contract. On the female side the hospital is overcrowded, and the vacant male beds are rapidly being filled. The isolation block is still occupied by male patients, and isolation has to be provided in the main building. The recovery-rate was 28·2 per cent., the rather low figure being the result of a serious outbreak of Flexner dysentery which accounted for 22 deaths. At the time the sewers of the sanitary spurs at the back of the female ward were being excavated for replacement, and infection was probably carried on the boots of men engaged on the work and women coming from the laundry. There was also an outbreak of typhoid fever on the female side, and six patients died. The South Staffordshire Company's water was being supplied to all parts of the hospital except the female division, which was served by private well-water. This water was found to have a high *Bacillus coli* count. The connexion of the female wards with the company's water-supply was carried out as rapidly as possible, and the well was reconditioned. Vaccine was given to as many contacts as possible, and there was no recurrence of either infection. There were 31 cases of influenza with one death. Four cases of general paralysis were treated with malaria; two improved, and two—both older cases—died. Of the patients discharged during the year, 49, or 65 per cent., were given preliminary periods of trial, 20 of them with money allowances. A thermal bath has been provided in both male and female divisions, and electric light has been extended in the male wards. Since the appointment of a cowman the milk-supply from the farm has increased by 3727 gallons during the last year. Condensed milk is not now used, but butter is only given to undernourished patients. An ultra-violet ray apparatus has been installed, and two female solaria have been fitted with "Vita-glass." Four attendants and one nurse passed their final examination. The third Staffordshire hospital at *Cheddleton* had 1107 patients in residence on Dec. 31st, 1928, a reduction of 27, due to boarding out under contract. There are 20 more women than the statutory number, but 21 male vacancies. Patients boarded out included many of the best workers, so that Cheddleton work has suffered. The medical superintendent points out that the provision of colonies for chronic cases, and the early discharge of convalescents, will materially increase the cost of running a mental hospital. General paralysis was treated by malaria, and four cases were discharged during the year. Five patients were known to be suffering from tuberculosis on admission. There were 38 cases of dysentery, three more than last year, but fewer of them were unexplained. Only three cases of encephalitis lethargica were admitted during 1928, bringing the total in residence to 26. Ten cases were treated, without benefit, with malarial blood, and ten were given tincture of stramonium, which gave temporary improvement in all cases. A ward has been arranged for training lads who have got beyond the control of nurses. They are taught tailoring, cobbling, gardening, drilling, handicrafts, and games, and the experiment seems likely to be very successful. The orthopædic department has been very successful in improving the deformities and habits of low-grade congenital cases. The usual statistics are not supplied in this report. In March, 1928, the visiting commissioners found 56 men and 36 women on parole beyond the estate, 30 men and four women on more limited parole, and three wards administered on the open-door system. They note that 26 per cent. of the female and 60 per cent. of the male nurses are certificated or registered; an orthopædic sister attends twice a week, an electrotherapeutic sister attends regularly, and a schoolmistress teaches the children for four hours daily.

At *Winson Green* there were 812 patients on Dec. 31st, 1928. The recovery-rate was 45·2 per cent., and 44 of the 83 patients discharged had a month's preliminary trial, 33 of them with financial assistance. The death-rate was 7·7 per cent., and post-mortem examinations were made in 95 per cent. The general

health was good; there was no infectious disease, except two cases of erysipelas and three of tuberculosis. The treatment of focal sepsis gave most encouraging results. Protein therapy was found beneficial, especially after operation had converted a closed sepsis into an open one. Eight male and two female general paralytics were treated by induced malaria. One man and one woman were discharged apparently in normal health, and one man died. Six dementia præcox patients were inoculated without benefit. Weekly entertainments are given, and every ward has a gramophone, and is being fitted with a loud speaker. Both male and female reception wards have been fitted with verandahs. The R.M.P.A certificate is now held by 78·1 per cent. of the attendants and 41 per cent. of the nurses.

At *Rubery Hill and Hollymoor* there were 1869 patients on Dec. 31st, 1928. The recovery-rate was 42·2 per cent. and the death-rate 6·44 per cent. Autopsies were carried out in 59·2 per cent. of the cases. General paralysis was treated by induced malaria, typhoid-paratyphoid vaccine, and chemotherapy, including tryparsamide, and three cases have been discharged recovered. Nasal sinusitis was suspected in 151 cases, and proved in 116—i.e., 33 per cent. of the total admissions. A very large number of other causes of toxæmia were suspected, and the principal aim of treatment here is to combat this toxæmia, generally without any coöperation from the patient. Only three cases of tuberculosis were recorded at the end of the year, and there was no other infectious disease. Cinematograph entertainments were given regularly and much appreciated. The dairy herd was twice tested for tuberculosis. During the year 18 attendants and 17 nurses obtained their R.M.P.A. certificate, bringing the totals to 93 and 61 respectively, while 14 attendants and 26 nurses were registered by the General Nursing Council.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED OCT. 26TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 131 (last week 154); scarlet fever, 3504; diphtheria, 1709; enteric fever, 141 (last week 140); pneumonia, 1008; puerperal fever, 58; puerperal pyrexia, 94; cerebro-spinal fever, 11; acute poliomyelitis, 30; acute polio-encephalitis, 2; encephalitis lethargica, 11; dysentery, 17; ophthalmia neonatorum, 104. No case of cholera, plague, or typhus fever was notified during the week.

Of the notifications of enteric fever, 41 were received from the County of London—namely, one each from Camberwell, Hammersmith, Islington, St. Marylebone, St. Pancras and Wandsworth, and 35 from Lewisham. Of the 14 notifications from Kent, 8 came from Beckenham and 2 from Penge.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Oct. 29th–30th was as follows:—Small-pox, 172 under treatment, 12 under observation (last week 163 and 9 respectively); scarlet fever, 2657; diphtheria, 2364; enteric fever, 90 (last week 69); measles, 231; whooping-cough, 125; puerperal fever, 22 (plus 12 babies); encephalitis lethargica, 125; poliomyelitis, 9; "other diseases," 19. At St. Margaret's Hospital there were 16 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 6 (3) from enteric fever, 14 (4) from measles, 11 (0) from scarlet fever, 12 (2) from whooping-cough, 51 (11) from diphtheria, 102 (19) from diarrhœa and enteritis under two years, and 56 (15) from influenza. The figures in parentheses are those for London itself.

The deaths from enteric fever outside London were reported from Liverpool, Darlington, and Merthyr Tydfil. In spite of the decline of diarrhœa generally Liverpool reported 22 fatal cases, Birmingham 8, and West Ham 5.

The number of stillbirths notified during the week was 264 (corresponding to a rate of 41 per 1000 births) including 45 in London.

THE HANDLING AND STORING OF CELLULOID X RAY FILMS.

THE British X Ray and Radium Protection Committee have now amplified their preliminary suggestions for the handling and storing of celluloid X ray films, which were made in our correspondence columns after the Cleveland disaster.[1] They point out that the X ray films of cellulose nitrate in common use burn with rapidity and violence when ignited. The burning of cellulose nitrate in bulk is well-nigh explosive in character. In addition, large quantities of carbon monoxide and brown fumes of oxide of nitrogen may be generated, both of which are highly toxic, and indeed led to a heavy death-roll in the Cleveland clinic fire. Carbon monoxide is itself inflammable and when mixed with air may give rise to an explosion; celluloid will burn in the absence of air.

Recommendations.

Regulations on the handling and storing of celluloid have been issued by the Home Office, local authorities, and others. The Protection Committee make the following recommendations.

X Ray Rooms.

In all rooms where X ray films are handled and stored *naked lights and open fires* should be prohibited. Smoking should be prohibited in or near film cabinets or film stores. Films should not be placed near steam pipes, radiators or the like. A ready supply of fire extinguishers together with buckets of water and sand should be available. The best means of extinguishing burning celluloid appears to be by the application of water.

Electric light installations should be of a permanent character. Electric light bulbs in or near film stores or cabinets should be enclosed in strong glass globes.

Generous ventilation should be provided in X ray rooms. As recommended in paragraph 5 of the International Protection Recommendations, the plan of an independent exhaust fan in each room is to be preferred to a duct system common to a number of rooms. Doors should be arranged to open outwards, particularly from film-drying rooms and dark rooms.

The *stock of X ray films*, whether unexposed or developed, should be kept down to the minimum. The stock of film records should be subjected to periodical drastic weeding out. Discarded films should be at once deposited in strong fire-proof metal containers with self-closing lids and destroyed at frequent intervals. They should not be placed in general refuse bins, or burnt in a closed vessel.

Stocks of unexposed films for immediate use or current files of developed films should be stored in cool and dry lock-up thermally insulated metal or hard wood cabinets. Such a stock should not exceed a total of about 50 lb.—i.e., about 1000 12 in. by 10 in. films—distributed among several cabinets. Cabinets for unexposed films should be lead lined. *Developed films*, which are temporarily taken into hospital wards or theatres for the convenience of the medical staff, should not be left lying about in table drawers or cupboards, but should be kept in suitable metal containers. Such films should be returned to the X ray department as soon as possible.

Film Stores.

Stocks of film exceeding about 50 lb. should not be stored in the X ray department, but in a special dry, cool, and well-ventilated room reserved exclusively for the purpose. The main requirements of such a room are as follows:

(*a*) The situation of the film store should not be such as to endanger the means of escape from any part of a building. The store should not be in the proximity of a lift-shaft or staircase-well, or near an intake or outlet of a general duct-ventilating system. In no circumstances should the store communicate with a general duct-ventilating system. The store should preferably be an isolated single-storey building with independent access. Failing that, it may be placed on the roof of a building or, if that is not feasible, in one of the higher storeys in as isolated a position as possible.

(*b*) The walls, floor and ceiling of the store room should be fireproof and of robust construction. The door should be fireproof and of a self-closing, closely fitting type. If the store room forms part of a main building, a useful further precaution is a fireproof vestibule with a second fireproof door.

[1] THE LANCET, 1929, i., 1223.

(*c*) The store should be provided with a direct vent to the outer air, preferably on the side remote from the most adjacent building. Such a vent should not normally be less than a square foot in effective area, a figure which may require to be exceeded for large stores. The vent may be protected against weather, &c., by thin unwired glass or other equally frail device.

(*d*) A film store may well be equipped with steel cabinets. If the store is designed to carry unusually large stocks of films (exceeding, say, 1 ton), it should be divided into completely isolated fireproof compartments each with its own vent and fireproof door.

(*e*) The temperature of the store should be maintained at a moderate figure. If the roof is exposed to the sun, suitable thermal lagging may be necessary in hot climates. It seems certain that good quality celluloid does not ignite spontaneously at any temperature attained under ordinary room conditions.

(*f*) The store should be equipped with an automatic water sprinkler device.

(*g*) If windows are provided in a film store, they are best situated in a north wall, though other considerations may be more important. Any windows immediately above the windows or vent of the store room should be provided with wired glass.

The committee, of whom Sir Humphry Rolleston is president, record their view that the production and use in this country of satisfactory "safety" X ray films should be encouraged.

AUSTRALIA.

(FROM OUR OWN CORRESPONDENT.)

Australasian Medical Congress.

THE third session of the Australasian Medical Congress (British Medical Association) was held in Sydney at the beginning of September under the presidency of Dr. G. H. Abbott. Over 900 people attended, including about 350 visitors from other States and from overseas, including Sir Ewen Maclean, Sir Louis Barnett, Dame Janet Campbell, and Prof. Hugh MacLean. The inaugural meeting was held at the Town Hall, Sydney, when Lord Stonehaven, Governor-General of the Commonwealth, opened the proceedings. At the first session in the Great Hall of the University speakers from each of the States and from New Zealand gave an account of

What is Being Done in Australasia Towards Cancer Research.

In the course of the discussion Dr. F. P. Sandes, Director of Treatment in the Cancer Research Department of Sydney University, said that the University had just completed a radium emanation station for the assistance of practitioners in outlying places. He urged that the treatment of cancer by X rays and radium should be vigorously encouraged, and pointed out that the greatest difficulty lay not in getting money but in finding men with sufficient originality of mind and method to take up cancer research. Under present conditions, the students who were prepared to devote their talents and their life to research were offered less than a tradesman's income. Dr. Peter MacCallum, professor of pathology in Melbourne University, said that the statistical and experimental research on the relationship between tuberculosis and cancer in mice, which was begun by Dr. Thomas Cherry some three years ago at the Walter and Eliza Hall Institute, had already given remarkable results. He described the work now being done at this institute and at Melbourne Hospital, the Baker Institute, and the Alfred Hospital. At the Commonwealth laboratories, said Prof. MacCallum, Dr. Hirst and Miss Doery were carrying on research on the nature of metabolism of cancerous growths and had so far confirmed the work of Warburg. Dr. E. Sandford Jackson reported that lead treatment in various forms had been given a considerable trial in a number of cases in Queensland, but had now fallen into disuse. Treatment by radium was making progress, and since the Commonwealth radium had become available in Queensland hospitals radium therapy had overshadowed every other kind of treatment. The present tendency, he said, seemed to be to put the radium under the control of small coteries of medical men, and this system was to be deplored. It was important that a whole-time paid director should be appointed to each State and that there should be an attempt in research into the causation of cancer under Australian conditions. Dr. A. A. Lendon stated that a deep X ray therapy plant would shortly be installed at the Adelaide Hospital. At present this form of treatment was being carried out privately on hospital cases with encouraging results. The organisation of the radium clinic at Adelaide was not yet complete. Dr. Bronhall in a communication described the position in Western Australia. As there was at present no medical school in Perth very little experimental work was being carried out except privately, but the treatment by radium was now being freely used. The Federal Government had recently offered the sum of £5000 to establish a cancer fund, and £18,000 had already been raised. It was intended to build a department at the Perth Hospital which would include X ray rooms and deep ray treatment rooms. Sir Louis Barnett said that in New Zealand investigations of cancer, through the hospitals, had been commenced 15 years ago. For very many years the cause of cancer had been unsuccessfully sought, and he suggested that investigation of aetiology was not the only line of research that should be followed. It was necessary to explain to the public that, while the cause of cancer was being sought, attempts were also being made to secure better and more effective treatment. Dr. Burrows, of the Commonwealth Department of Public Health, told how for several years the Commonwealth Government had been endeavouring to foster cancer research and treatment in Australia. Subsidies amounting to £13,200 had been paid since 1924. The two most important problems were to find means of securing early diagnosis of cancer and of affording every member of the community an opportunity to obtain the latest and most up-to-date forms of treatment. The purchase of radium by the Commonwealth Government had tended to focus interest in treatment and research which had been steadily growing in Australia. The object of the Government was to provide a national system by which every member of the community could obtain cancer treatment of the highest class. Skilled surgical treatment was already available. What was necessary was the provision of other services. Dr. L. M. McKillop, of Brisbane, speaking on the prevention of cancer, said that medical men, as a profession, were not doing what they should towards prevention. Dr. J. L. Jona, of Melbourne, made an urgent plea for the creation of a central medical research council for the coördination of the work now proceeding all over the Commonwealth. He pointed out that under the present condition men who were making investigations in one State might not know what was being done elsewhere.

Radiation and Living Cells.

Prof. H. G. Chapman, Director of Cancer Research in Sydney, said that during the last five years a team of investigators had gathered in Sydney to learn more about the action of radiation on living matter. The study had mainly been confined to the action of X rays. The experiments of Dr. W. Moppett had shown that a beam of rays of so few adjacent wavelengths as to be termed homogeneous, might be as active as a mixed beam several thousand times as powerful physically. He had noted that some wavelengths caused atrophy of the cells of the chorio-allantoic membrane of the chick embryo, whilst others produced hypertrophy; other wave-lengths of the same intensity appeared to be without any biological activity. Further, the simultaneous application of beams of radiation with antagonistic action on tissues led to no biological effect on the membrane. It had been shown that several homogeneous beams of rays were potent biologically. The physicists in the

Sydney team had observed these wave-lengths to be the discontinuities in the adsorption of rays by lead, uranium, and molybdenum. Chemical analyses had shown lead and uranium to be present in the eggs used in these researches. It thus appeared that there was evidence that the heavy metals produced an exceptional adsorption of radiations of certain wave-lengths. Whether this adsorption was connected with the biological results remained to be seen. A study had been begun to ascertain whether the properties of lead as a catalytic agent were altered by the adsorption of X rays. Attention had been directed in Sydney to the way in which radium brought about the disappearance of new growths, and it seemed that immunological processes were concerned. Research had been undertaken to ascertain whether immunisation could be produced in the human subject by injection of proteins of tumours. Evidence was accumulating that antibodies might be produced against the proteins of the multiple melanotic sarcomata of man.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The Royal Society of Edinburgh.

Sir Edward Sharpey-Schafer, the physiologist, has succeeded Sir Alfred Ewing, the physicist, as President of the Royal Society. In his retiring address Sir Alfred gave a masterly sketch of the progress of science in the 57 years of his experience, and emphasised the strong drift now manifest from physics to biology. He almost seemed to suggest that, for the time being, physics may be regarded as a series of extinct volcanoes, while biology shows an immense continent for exploration. But it is to be remembered that Einstein and Eddington are still young, while J. J. Thomson, Rutherford, and their many distinguished pupils are still with us. The quantum theory as well as general relativity have yet to be made intelligible and brought into coherence with one another, and with the ordinary experiences of life. The urgent problem for the physicist is to project an atom that will be identically the same for living matter as it is for dead matter, and on that problem some mathematical physicists are actively engaged. But unquestionably the interest in biology is growing every year. Sir Edward Sharpey-Schafer is not only a distinguished physiologist, but the symbol of a great biological movement.

Animal Breeding Department.

The work of this department, under Prof. F. A. E. Crew, is at last persuading practical breeders and farmers that research yields results of outstanding importance, and that science is a genuine guide to stock-rearing and stock selection. Recognition of this is seen in a gift to the department of £30,000 by Mr. T. B. Macaulay, president and managing director of the Sun Life Assurance Company of Canada. The wealthy corporation over which he presides has before now shown itself mindful of pioneer scientific effort. Mr. Macaulay, whose father was a Lewis man, recently presented a new wing, fully endowed, to the Lewis Hospital. The department has also received a similar gift of £30,000 from the Rockefeller International Board, and £10,000 from Lord Woolavington.

A Children's Ward for Nose and Throat Cases.

A special ward of 12 beds for the treatment of ear, throat and nose cases has been added to the Royal Edinburgh Hospital for Sick Children. This brings the total beds to 132. The new ward unit includes a properly fitted doctor's room, where minor operations and dressings can be done. About 1000 operations annually are performed in the hospital for adenoids and tonsils, and in 1927 50 mastoids were treated. The number of new patients attending this department rose from 767 in 1927 to 1200 in 1928, and the ward will make it possible to take in for short periods a much larger number than hitherto. Many adenoid and tonsil cases require indoor care after operation, and to send them home direct from the out-patient department is often very undesirable. In accepting the care of the ward Dr. Douglas Guthrie, who has been aural surgeon to the hospital since 1919, described the ward as a notable addition which would certainly prove a real boon to the patients.

The Medico-Chirurgical Society.

At a meeting of the Medico-Chirurgical Society of Edinburgh on Oct. 30th new officers were elected to fill the vacancies caused by the annual retirements. The office-bearers for the coming year are as follows:—

President: Prof. G. Lovell Gulland. Vice-Presidents: Dr. R. A. Fleming, Mr. J. W. Dowden, and Dr. E. F. Armour. Councillors: Dr. Charles McNeil, Dr. Andrew Ritchie, Dr. Murray Wood, Mr. J. W. Struthers, Dr. C. W. Somerville, Dr. W. Fordyce, Dr. H. G. Langwill, and Dr. Alex. Goodall. Treasurer: Dr. Macrae Taylor. Secretaries: Mr. A. Pirie Watson and Dr. H. L. Watson Wemyss. Editor of Transactions: Dr. Fergus Hewat.

PUBLIC MENTAL HOSPITALS.

SCIENTIFIC AND RESEARCH WORK.

THE first part of the Fifteenth Annual Report of the Board of Control, which we reviewed in a leading article [1] some weeks ago, deals with the administrative work of the public mental hospitals. The second part of the Board's report [2] contains, in addition to the entries of the Commissioners at the various hospitals and some statistical tables, the reports of the research carried out at the institutions throughout the country.

At *Birmingham*, as in previous years, work has centred round chronic infections, especially of the nasal sinuses and intestinal tract, and an attempt is being made to correlate the findings with disturbance of the pituitary gland, endocrine imbalance, and local damage to brain tissue. A chronic infective process has been found in a large proportion of cases, and in some it has been possible to trace it back to an acute infection such as measles, influenza, or scarlet fever. The areas of unresolved residual infection start a long chain of physical, and ultimately of mental symptoms. The relationship of actinotherapy to focal sepsis has been investigated; it appears that ultra-violet light causes an exacerbation reaction in "closed sepsis," and a healing reaction with diminution of symptoms in "open" or opened sepsis. An inquiry into the relation of mental symptoms to phases of the reproductive cycle has revealed a "menstrual reaction," or intensification of conduct disturbance during the premenstrual and menstrual phases, and a "moliminal reaction" or similar periodic intensification during the amenorrhœa of mentally disordered patients. The appearance of these reactions indicates that an ovary is still functioning, although it may be a diseased one. Bacteria have been found to pass from a diseased sphenoidal sinus to the pituitary gland, and it is believed that signs of pituitary disorder may be set up by a closed sepsis of this kind. An investigation into the Wassermann and Widal reactions of 176 mentally defective children at the Monyhull Colony has suggested an ætiological relationship between mental defect and gastro-intestinal infection in early life. Only 3 per cent. gave a positive Wassermann reaction.

At the *Cardiff City Mental Hospital* an inquiry is being made into the possible ætiological significance of a filtrable virus in dementia præcox. Work on

[1] THE LANCET, Oct. 5th, p. 719.
[2] H.M. Stationery Office. Pp. 360. 9s.

blood-cholesterol has been published in THE LANCET (Feb. 23rd, 1929) and tends to show that the blood-cholesterol is a little lower in the pre-paroxysmal than in the paroxysmal phase of epilepsy, but shows only slight changes with the menstrual cycle. Work on the hydrogen-ion concentration of the blood and urine is being continued.

The *West Riding Mental Hospital* at *Wakefield* investigated a number of cases of dysentery; at *Wadsley*, Sheffield, malarial treatment was tried for three cases of dementia præcox, one of which showed steady improvement. Eight others were treated with hormone extracts, and two of them improved enough for discharge. There are a number of post-encephalitic cases in the hospital, and these are being investigated. Some benefit has been obtained in parkinsonism from a daily morning injection of hyoscin followed by two oral doses of stramonium in the afternoon and evening. At the *Storthes Hall Hospital*, *Kirkburton*, the Meinicke turbidity reaction was tried and found to be a valuable auxiliary to the Wassermann reaction, rapidly and easily carried out.

Of the *Lancashire Mental Hospitals*, that at *Lancaster* was occupied with an intensive antityphoid campaign, as sporadic outbreaks had occurred in the two previous years. Eight carriers were identified and no further cases have occurred. Malaria treatment is followed up by tryparsamide in general paralysis, and the relationship between the malaria infection and the cytological formulæ of the blood have been studied. The effects of ultra-violet light have been noted; the best results are obtained in debilitated patients who refuse food, and in stuporose melancholics. Schnee baths have been found useful for rheumatoid arthritis, sprains, and synovitis, as well as in the after-treatment of fractures, and as a general tonic in muscular affections. At *Prestwich* the malarial treatment has been studied. At *Rainhill* a number of cases of encephalitis have been examined bacteriologically and treated with autogenous vaccines. Cases of general paralysis have been followed up, and the conclusions arrived at are that malarial treatment alone is as effective as malaria followed by tryparsamide, but that tryparsamide acts as a general physical tonic and allays motor restlessness so that the pyrexial attack is less dangerous. It is, however, apt to cause serious complications, especially visual and hepatic disturbance, and must be given cautiously and controlled by the lævulose test and van den Bergh reaction. No case has been completely cured, if cure be taken to mean complete remission of mental symptoms, serological changes, and physical signs. Dr. C. M. Bamford calls attention to a special acute type of dementia præcox, characterised by restlessness, confusion and impulsiveness, lasting for a few months, with very intense physical deterioration, no tendency to remission, and early death. In all the cases examined post mortem he has found a large macrocephalic brain with a complex convolutional pattern, a marked fibrosis of all the solid viscera, especially the liver, kidneys, and ductless glands, and an infantile cardiovascular system. At *Whittingham* the Kafka paraffin reaction of the cerebro-spinal fluid has been found to agree in almost every case of general paralysis with the Lange gold and colloidal gamboge tests, but not to show meningitic curves. Tubercle bacilli have been demonstrated in the fæces in unexpected cases by the Ligroin and Zeihl-Neillson methods. It has been assumed that puerperal insanity is of two types: melancholia produced by pressure of the uterus on the splanchnic nerves, causing increased blood pressure, and mania due to a toxic factor producing cerebral irritation. Corresponding treatment has given good results; in mania a binder over several layers of towelling is applied, with the aim of increasing arterial pressure by increasing abdominal pressure. The Boltz test has been tried on 346 cases; it is only positive in general paralysis and does not always agree with the globulin test, nor is its absence a reliable indication of the absence of general paralysis. It tends to change after malarial treatment, but not as often or as rapidly as the globulin test.

The *London County Mental Hospital* at *Banstead* submits a report on the treatment of general paralysis with relapsing fever, saprovitan and milk injections. None of them was quite as good as malaria, and saprovitan was distinctly disappointing. It seems probable that the milk reaction is due to incomplete sterilisation and not to a genuine protein reaction. Malarial treatment is also being investigated at *Bexley*. At *Claybury* the Meinicke micro-reaction in the serum and the hydrogen-ion concentration in the urine have been investigated. Malaria has been tried in idiopathic epilepsy, but apparently only causes temporary benefit. At *Horton* ultra-violet light was found most useful in toxic cases and melancholias associated with the menopause. Malarial treatment here is made the subject of intensive research and not given as a routine only; a quartan strain is being tested. At *West Park* the oculogyric crises of encephalitis have been studied; suggestion seems the most potent factor in shortening or preventing attacks. Interference with normal cortical control accounts for the increased suggestibility of these patients, as well as for the release phenomena of different subcortical centres, causing tonic fits, ocular spasms, respiratory crises, myoclonias, emotional facility, and paradoxical reactions. A large proportion of the encephalitics who suffer from oculogyric crises subsequently require certification. The ætiology of alcoholism has been investigated at the *Maudsley Hospital* and attention drawn to the fact that we know almost nothing of the anatomical and biochemical basis of the euphoric and narcotic effects of alcohol, of addiction and distaste, and of susceptibility and immunity. Tryparsamide has been found valuable for general paralysis, but its action was enhanced by combination with malaria. The sedimentation velocity of erythrocytes in the psychoses has been studied but found of no diagnostic value except in recognising pulmonary tuberculosis in cases where the patient cannot give intelligent coöperation. The *Central Laboratory* of the London Mental Hospitals has continued its work on the pathology of schizophrenia and the histology of general paralysis. It has been found that the primary disturbance in the former lies in the inexcitability of the respiratory centre, a condition closely resembling that of normal sleep. The acid-base equilibrium was found in every way similar to that of a normal sleeping man. The absence of spirochætes in the brains of general paralytics after malarial treatment has been confirmed by numerous examinations. The stretch reflexes have been studied and work has been done on the relation of muscle tension to mental effort.

Research into the relation of mental disorders and the menstrual cycle is being continued at the *Cheshire County Mental Hospital* at *Chester*. Amenorrhœa has been found in one case in seven and dysmenorrhœa in one case in five of established psychosis, while a high percentage of epileptics show pre-menstrual or menstrual grouping of the fits. At *Macclesfield* light therapy has been investigated and also the liability to suicide in various psychoses. Suicide seems to depend on a faulty physical inheritance, in which endocrine malformation is a prominent factor.

At the *East Sussex County Mental Hospital* the Kahn test has been found less reliable than the Wassermann and the urochromogen test for tuberculosis was found very unreliable. Minchin's technique for identifying tuberculous yeasts is being tried and the acidophilus and streptococcal contents of the intestine have been investigated; acidophilus protection seems to be markedly deficient in mental patients.

At the *Dorset County Mental Hospital* a search for typhoid carriers and a leucocyte study has been carried out. The Meinicke micro-reaction, the Takata-Ara colloidal reaction, Buscaino's black reaction, and Scheiner's reaction are being investigated.

At the *Croydon Borough Mental Hospital* Kahn's test has been found simpler and more reliable than the

Wassermann reaction. In a few cases of epilepsy ephedrine has been found more efficacious than luminal or bromides, and glucose has been found an invaluable adjunct to the treatment of asthenic cases. The sedimentation-rate of the erythrocytes has been studied; it is markedly increased in pulmonary tuberculosis, carcinoma, salpingitis, and diabetes mellitus. Ultra-violet light, although useful for skin disease, has not caused any improvement in mental cases.

The Vernes tests are being investigated at the *Leicester City Mental Hospital*. A number of cases of dysentery were studied during the year and general paralytics were treated with malaria.

St. Andrew's Hospital, Northampton, puts all its patients through a routine scheme of research and various forms of hydrotherapy have been studied. A detailed examination is being made of the bacteriology of the stomach and intestine. At *Wonford House, Exeter*, the hæmatopoietic tissues have been found to be functionally impaired in general paralysis; they are unaffected in non-paretic syphilis. Consequently an infection calling for polymorphonuclear leucocytosis will flood the blood of a paretic with immature leucocytes. The depression of leucopoietic activity is thought to account for the ease with which bedsores are developed and the liability to intercurrent infection. It is suggested that it is futile to over-stimulate an exhausted system, and that pyrexial treatment should only be used when stimulation of the leucogenic functions is likely to be successful—i.e., at the earliest stage or as a preventive routine measure in the secondary or tertiary stages of syphilis. Pyrexial treatment given to a patient with a poor leucocytic response only hastened the paresis.

This brief summary by no means covers all the scientific work undertaken at the mental hospitals. It takes no account of the articles sent to medical journals and papers read at meetings of the Royal Medico-Psychological Association. When it is realised that most of this work is done in remote country places, often far removed from the encouragement of contact with other workers and without the stimulus of team enthusiasm, the record is highly encouraging. It is true that there are more than a hundred mental hospitals and many of them are silent on research, but the printed reports are enough to show that the scientific spirit is alive in the mental hospital service, and we are happy to call attention to it.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt.-Comdr. N. A. H. Barlow to be Surg. Comdr.

ROYAL ARMY MEDICAL CORPS.

Maj. H. F. Joynt retires on retd. pay.

ARMY DENTAL CORPS.

Lt. E. C. Browne, temp. Dental Surg., Gen. List, to be Lt.

ARMY RESERVE OF OFFICERS.

Lt.-Col. A. R. C. Parsons having attained the age-limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL FORCE.

Capt. E. R. Lovell to be Maj.

ROYAL AIR FORCE.

J. G. Skeet is granted a temporary commission as a Flight Lt.

Flying Officer J. J. MacAndrews resigns his short service commission.

Flying Officer H. D. Humphreys is promoted to the rank of Flight Lt. (Dental) on promotion to the rank of Captain in the Army Dental Corps.

INDIAN MEDICAL SERVICE.

Lt.-Col. (Bt. Col.) W. H. Leonard to be Col.

Temp. Lt. Sat Chit Anand relinquishes his temp. commn.

Correspondence.

"Audi alteram partem."

JAMES BLACK'S DESCRIPTION OF CONTRACTILITY OF CAPILLARIES (1825).

To the Editor of THE LANCET.

SIR,—In the second edition of Krogh's monograph on the capillaries, which you reviewed last week, attention is drawn to a group of investigations on the contractility of the capillaries carried out early in the nineteenth century. Mention is made of Wilson Philip's studies, and also of those of Johannes Müller, who sought evidence for or against the existence of peripheral propulsive agents which might assist the heart in overcoming the peripheral resistance. Krogh, however, and also Lewis, fail to mention the interesting study of James Black (1788?–1867), who, in 1825, published in London a book of 176 pages, entitled "A Short Inquiry into the Capillary Circulation of the Blood; with a Comparative View of the More Intimate Nature of Inflammation." Black described in no uncertain terms the phenomenon now referred to as the "red reaction," and he observed beyond any possibility of doubt the independent contractility of the capillaries. The following protocols of two of his experiments, which occur on pp. 54 and 55 of his book, will serve to indicate the nature of his observations.

"*Exp. 4. On a frog.*—The natural circulation of the arteries in the web almost invisible, and without any red colour; but as soon as it was discovered, it was observed to circulate with considerable velocity, and the globules were not easily to be traced. Extension and gentle fastening of the foot even by the fingers increased the flow of blood, and soon filled many of the colourless vessels with red globules. The application of Aq. Ammon., and more particularly of the salt solution, soon rendered the whole capillaries visible and of double their former diameters; the circulation becoming slower, and congestion following in the veins, and lastly in the arteries. The brain was crushed, and the circulation observed in the foot previously unexperimented upon. The vessels sooner than before became more visible, the circulation also became retarded, and congestion took place in the order of vessels as before remarked; but the circulation continued 20 minutes after the injury of the brain, and, lastly, the blood slowly retired from the smaller vessels of all descriptions, and left the web pale and flaccid."

"*Exp. 5. The web of a young duck's foot was made the subject of this experiment.*—The veins, in beautiful branches, were easily seen by a common magnifying glass, but the arteries were only visible after some stimulation. The web could not be rendered transparent enough to see the red globules by the microscope. Aq. Ammon. was applied to both sides of one of the divisions of the foot; in two to four minutes great contraction took place in the large vessels; so much so, that many branches were rendered invisible, and others appeared like the finest hairs, which, before in their natural state, seemed three times the diameter. It was not a mere recession of the blood, for the line of the larger vessels was very distinctly contracted and well defined. After the space of about four minutes, all the vessels acquired their former natural diameters, and still further enlarged to complete phlogosis of the part, or to what may be termed inflammation. A fresh application of Aq. Ammon. produced a fresh contraction, but it was not near so complete as the former. The other foot was treated with a saturated solution of Mur. Sodæ, which application was soon followed by great enlargement of the vessels, especially of the larger veins in the web, which seemed much congested, until bathed on both sides with Aq. Ammon. when after five minutes general contraction was produced, and many of the small vessels were rendered invisible. During the above experiment the animal scarcely struggled."

On the basis of these and other observations Black draws 12 carefully worded conclusions, several of which may be given in his own words.

"*Third.*—The healthy and natural circulation in the capillaries depends, directly, on a tonic or *tensive* state of their delicate tubes; and immediately, on some power inherent in the part, a degree of which power seems to reside in the blood equally with the vessels, and its energy depends more on the integrity or vitality of the part or parts of this system than upon any impulse derived from the heart."

"*Fifth.*—A strong stimulus suddenly applied, in a short time, produces a contraction of all the fibres of the part and a diminution of the diameters of the whole classes of vessels, but more particularly of the arteries, which is followed, at a greater or less distance of time, by a corresponding dilatation—according to the extent of which, the phenomena of inflammation will be more or less observable; and more so, if the *vis a tergo* be powerful or stimulated."

"*Sixth.*—A gentle or lesser stimulus produces an evanescent contraction, followed by relaxation, increased redness, and a slight acceleration of blood in the *leading* capillary arteries and veins; owing, it seems, to the increased capacity of the distended reticular vessels, while the former are yet relatively contracted."

"*Seventh.*—The circulation in the capillary system is independent of the controul [sic] of the heart, except so far as this organ affords a constant pressure and a ready supply of blood, upon which the capillary vessels may act; and it is still more independent of the brain."

"*Tenth.*—The condition of a part, in what is termed inflammation, is essentially seated in the capillary vessels, and primarily and chiefly in those of the veins."

Black then points out that his observations are in sharp contradiction to the conclusions of Haller (1766) that the capillaries were passive agents, whose diameter depended only upon the pressure of blood passing in them. The author considered the possibility that the capillaries may act as peripheral hearts, but draws no definite conclusion. In discussing the structure of the capillaries, he says, "the muscular or elastic tunic of the larger arteries, about which there has been so much controversy, is either lost in the capillary tissue or is so entirely attenuated that it is incapable of demonstration, even by the aid of a strong microscope."

Black records (p. 50), that his observations "were instituted in the summer of 1822. They would have been prosecuted to a much greater extent if an amaurotic affection of one eye of the experimenter had not made its appearance during these and some other optical pursuits." He was born in Scotland, and was admitted a Licentiate of the Edinburgh Royal College of Surgeons in 1808 and M.D. of Glasgow in 1820. From 1810 to 1839 he practised at Bolton, and then moved for ten years to Manchester. In addition to his medical writings, which were numerous, he contributed several papers on geology and Roman archæology to the Manchester Philosophical Society.

I am, Sir, yours faithfully,

J. F. FULTON.

Magdalen College, Oxford, Oct. 15th, 1929.

PS.—Since writing this letter I have come upon a work of Marshall Hall entitled "A Critical and Experimental Essay on the Circulation of the Blood, especially as observed in the Minute and Capillary Vessels of the Batrachia and of Fishes" (London: 1831, 187 pp., 10 plates). The anatomical distinction between arterioles and capillaries is here clearly set forth, but the writer was unable to detect independent contraction of capillary vessels, and he concludes that "every fact relative to the capillary circulation leads us to ascribe its various phenomena to forces impressed upon it from without," and "there is nothing of satisfactory evidence or argument for an automatic power in them" (p. 90). Marshall Hall exerted a powerful influence upon contemporary physiological thought and his conclusions were undoubtedly responsible for the scant attention which the observations of Black and Wilson Philip received. —J. F. F.

TANNIC ACID FOR BURNS.

To the Editor of THE LANCET.

SIR,—The results of a questionaire sent out to various hospitals and authorities have been considered by the medical advisory committee of the Industrial Welfare Society. The consensus of opinion shows that, although it has been proved to be of considerable value, especially in hospitals, it should be used only under medical supervision and not as a first-aid application for burns by the general public or ambulance attendants. Nor in the nursery, owing to the complicated character of the treatment, and the extremely poisonous nature of the corrosive sublimate suggested to be used with the tannic acid.

I am, Sir, yours faithfully,

D. A. COLES,
Chairman, Medical Advisory Committee of the Industrial Welfare Society.

51, Palace-street, Westminster, S.W. 1, Nov. 1st, 1929.

THE DIAGNOSIS OF LARYNGEAL CANCER.

To the Editor of THE LANCET.

SIR,—Sir James Dundas-Grant has mentioned my name. May I reply? The battle of the biopsies will be fought by laryngologists as long as that of white and brown bread by dietitians, but the recent discussion and a subsequent correspondence with Sir James has suggested to me a classification that may prevent our talking at cross-purposes.

Class A.—The removal of a piece of the primary lesion by an endolaryngeal method: (1) when any subsequent operative treatment will be a laryngectomy or pharyngectomy; (2) when any subsequent operative treatment will be a laryngo-fissure or the making of a window in the thyroid cartilage for the insertion of radium.

Class B.—The removal of a lymph gland for evidence of secondary involvement.

In *Class A* (1) I will agree that a biopsy may be made before submitting the patient to an operation of such a magnitude. In such cases the growth is extrinsic or if primarily intrinsic is becoming secondarily extrinsic. Further, it is large. For these two reasons it is probable that the piece removed will be large enough and central enough to produce a section from which a certain diagnosis may be made.

It is in *Class A* (2) that the difference of opinion prevails. I belong to the school that would make the diagnosis by clinical observation, by waiting and watching, and the exclusion of other diseases by general medical and by bacteriological and serological investigations. In my opinion it is wrong to attempt a biopsy in these cases. The growth is intrinsic and limited to the cord, and it is small. Therefore there is a chance that the piece removed will be small and from the periphery with the result that the section may not enable a definite decision to be made. The diagnostician is then in a worse position than before; he must fall back upon the policy of waiting and watching, but under great difficulties. The wound must first heal, and when it has healed the observer cannot be sure what part of the change from the original picture is due to the trauma, and what part is due to an extension of the disease.

Further, in both cancer and tuberculosis the removal of a piece may do harm. In cancer it may result in a rapid extension of the growth so that it passes from the stage where the relatively minor operation of laryngo-fissure must be replaced by the major one of laryngectomy. In tuberculosis it is equally harmful. To call the operation of laryngo-fissure "life-endangering" in tuberculosis may be correct; but one cannot deny the science epithet to the removal of a piece for microscopical section.

A study of the cases recorded at the last meeting of our section bears out this view. Sir James showed microscopical sections of two cases. In each they confirmed that which he had made. In his second case the patient was referred to him as one of tuberculosis, and I infer that he took a piece for microscopical section because he disagreed with this. In the third case the patient was sent to him with the diagnosis of growth and he thought it tubercle. Again, the section proved him to be right. In neither case therefore did the sections help him in his diagnosis; they merely gave him pathological support in his difference of opinion with others. He produced no section in which his clinical diagnosis was proven wrong and by which he was saved from calamity. Against biopsy we have Dr. Andrew Wyllie's case (*Proceedings*, 1929, p. 72) where the microscopist was wrong, and Dr. Jobson Horne's case (*Proc.*, p. 68) where even after operation the opinions of microscopists

varied. To these we may add the classica case of the Emperor Frederick and similar cases where the microscopical evidence from the part removed has been inconclusive and has led to delay and a terrible suspense. The only evidence produced in favour of biopsy at this meeting was negative. Dr. Jobson Horne instanced (*Proceedings*, pp. 66, 67) four cases where the larynx was opened for a tuberculous lesion which had been thought to be cancer. Apparently these were gleaned from the history of laryngology over a period of 50 years.

Class B does not afford many opportunities for performing a biopsy and none from the cases that come within Class A (2). In cases coming under Class A (1) section of a gland may clinch the diagnosis as in the following patient. A man came up to the clinic with a cauliflower mass in the larynx which looked like a carcinoma. He had such dyspnœa that it was necessary to do a tracheotomy on the next day before the complete medical examination could be made. While doing this operation the cricothyroid gland was found to be enlarged: the section proved to be tuberculous. This was subsequently confirmed by examination of the lungs.

I am, Sir, yours faithfully,

Welbeck-street, W., Nov. 4th, 1929. T. B. LAYTON.

THE MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE SOCIETY, LIMITED.

To the Editor of THE LANCET.

SIR,—In reply to Mr. Bowdler Henry's attack on the board of this Society, I should like to say—

(1) that I was present at the general meeting and heard the discussion on Dr. Harvey Hilliard's resolutions and was perfectly satisfied with the board's treatment of them which was at once sympathetic and firm; and

(2) that as the unanimous recommendations of the directors, as set out in the annual report, were directly attacked it was only to be expected that the board would send out for proxies.

I am, Sir, yours faithfully,

Chelsea, S.W., Nov. 1st, 1929. E. F. THOMAS.

THE BROWN *v.* WHITE BREAD CONTROVERSY.

To the Editor of THE LANCET.

SIR,—The letter by Dr. S. H. Belfrage in THE LANCET of Nov. 2nd, asking those who hold opposing views to those of Prof. V. H. Mottram and Miss Gladys A. Hartwell to express their views on these experiments, induces us to make the following comment. Mottram and Hartwell have now definitely abandoned their former contention that white bread contains a considerable amount of vitamin B, and is not markedly inferior in that respect to wholemeal bread or germ bread. They now admit that the two last-named types of bread are richer in vitamin B, although they still conceal the fact that white bread is exceedingly poor in vitamin B. Incidentally they make an error in suggesting that the controversy has been complicated by the advent of germ breads. If they had consulted some such standard text-books on nutrition as Hutchison's "Food and Principles of Dietetics," they would have found that germ breads had been manufactured and consumed long before the vitamins were discovered. It is therefore now agreed that white bread is inferior to wholemeal bread and germ bread in so far as its vitamin-B content is concerned. Whether this is a matter of importance to the general public or not may be left to the judgment of your readers.

Mottram and Hartwell now shift the discussion to a new ground. They say that "an ordinary diet" contains so much vitamin B amongst other things that "the deficiencies of white bread" are amply compensated. In saying this they beg the whole question at issue. We may quote here the following sentences from our previous paper[1]:—

"On a varied diet which includes milk, butter, eggs, porridge, potatoes, and other vegetables, the absence of vitamin B from bread may not be a serious defect. But the people who can afford such a diet do not eat much bread anyhow. It is among the poorer classes, and especially the children of the poorer classes, where bread represents the bulk of the daily diet, and where butter is replaced by margarine, that the absence of vitamin B from white bread has to be considered as a serious dietetic defect. Reports of medical officers of health show that many of these children live on a diet composed of white bread, margarine, jam, and fish, with perhaps some potatoes. Such a diet is certainly deficient in both vitamin A and B, and could be made adequate as regards the latter vitamin by the consumption of bread rich in vitamin B."

It will be seen that there is here again agreement between our views and those of Mottram and Hartwell, but it will also be seen that these authors evade the issue that according to the reports of medical officers of health many children live on a diet composed chiefly of fish, potatoes, white bread, margarine, and jam. This is not "an ordinary mixed diet," and from what we know of the vitamin-B content of the articles of food composing this diet, it is poor in vitamin B_1. It would not require long and costly experiments to prove whether on such a diet the partial substitution of wholemeal bread or germ bread for white bread as suggested by us would or would not have a beneficial effect.

The diet chosen by Mottram and Hartwell in their experiments, and called the "diet of the Essex agricultural labourer," is a very different one. Their experiments, incomplete as they admittedly are, prove that the diet is defective, and since the defects are not remedied by the substitution of bread rich in vitamin B for bread poor in it, all that one can conclude is that the defects of this diet cannot be remedied by the addition of vitamin B_1 alone. But when in the last sentence of their paper the authors make the bold assumption of implying that the diet called "the diet of the Essex agricultural labourer" represents the diet of the working classes of this country we cannot agree with them. There is no justification for this assumption. Nobody can lay down a definite diet as representing that of the working or any other class. Diet varies from household to household. The letter from Sir Bruce Bruce-Porter and the experience of medical officers of health referred to in the quotation from our paper paint a very different picture from that given by Mottram and Hartwell.—We are, Sir, yours faithfully,

J. C. MOTTRAM.
W. CRAMER.

Radium Institute, Imperial Cancer Research Fund, Nov. 4th, 1929.

CURES AND PREVENTION.

To the Editor of THE LANCET.

SIR,—Dr. Ainley Walker makes a fine point. The fact cannot be denied that the injection of the antitoxin causes destruction of the diphtheria bacilli in the patient, whatever the exact method of that destruction is, and is therefore an intravital germicide. I will take him on the theoretical point he has made. Assuming, an assumption with which, perhaps, he will not agree, that the toxin is the ferment by which the microbe hydrolyses, therefore kills, the living tissues, in order to live, surely if the combining power of that ferment were neutralised, and the ferment, therefore, not capable of bringing about the digestion of the material, the microbe must die of inanition; the antitoxin can therefore quite properly be considered a germicide. If antiferments to X.Y.'s digestive ferments were injected into X.Y., causing his death by inanition, it would be a very efficient homicide.—I am, Sir, yours faithfully,

Harley-street, W., Nov. 1st, 1929. W. M. CROFTON.

[1] THE LANCET, 1927, ii., 1090.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

HIGHLANDS AND ISLANDS (MEDICAL SERVICE) FUND.

THE Scottish Office have issued the following explanatory memorandum in connexion with the legislation which the Government are introducing this session to authorise the removal of the existing limitation of the Government grant to the Highlands and Islands (Medical Service) Fund: "Subsection (1) of Section 1 of the Highlands and Islands (Medical Service) Grant Act, 1913, authorises the payment to the Highlands and Islands (Medical Service) Fund established under that Act of an annual grant of £42,000 out of moneys provided by Parliament to be applied for improving the medical service in the Highlands and Islands of Scotland. The Fund is administered by the Department of Health for Scotland in accordance with schemes made by the Department with the consent of the Treasury. Any unexpended balance of grant is not liable to surrender at the close of the financial year. Since 1920 the expenditure out of the Fund has been greater than the annual income, the excess having been met from unexpended balances of grant which accumulated during the war years, when it was impossible to give full effect to the approved schemes in the conditions then obtaining. These accumulated balances will be exhausted this year, and it is necessary to make further provision for financing the Fund. It is proposed to introduce legislation to remove the limitation of the grant to £42,000 by authorising such additional sum as may be annually voted by Parliament for the purpose. The additional sum proposed in any year will be included in the Estimates of the Department of Health for Scotland. It is estimated that the additional sum required to be so included will be £10,650 for the current financial year and from £20,000 to £30,000 in future years."

THE WIDOWS' PENSIONS BILL.

In the House of Commons on Wednesday, Oct. 30th, Mr. A. GREENWOOD, Minister of Health, moved the second reading of the Widows', Orphans' and Old Age Contributory Pensions Bill, and said that it was in accordance with their election pledges and the statement contained in the King's Speech that the Government had brought forward the Bill, and had undertaken a comprehensive inquiry into the complex system of social insurance that now existed. The Bill was a small instalment of a larger policy. The health insurance scheme, on the one hand, and contributory pensions on the other, were closely interlocked as regarded range of insurance and collection of insurance; but on the fundamental matters of finance and general organisation there were quite distinct principles at work. In consequence of the system having grown up piecemeal—and he was not complaining about that—different principles entered into the conception of services that were provided for closely related needs, and there had been distinct forms of administrative machinery set up for services which were broadly similar in purpose. Because of that, and the other problems which were now in the forefront of public opinion, it was the view of the Government that the time had arrived when they should take stock of the existing system of social insurance, and a Committee of the Cabinet was engaged on a survey of the various schemes, an analysis of the various and complex problems which schemes developed on independent lines inevitably brought into existence, and consideration of the very large and important questions of the relations between insurance, on the one hand, and the various forms of social problems which were met outside of insurance on the other. The Bill before the House only professed to deal with the more important problems affecting the insured people arising out of the Act of 1925; the other and larger issues were precisely those questions which were now being examined by the Cabinet. It was the desire of the Government to build up by stages towards a comprehensive, adequate, harmonious system of social insurance which would enable all citizens effectively to meet the misfortunes and risks of life. To that task they had laid their hands; they would not consider that they had completed it until they had fulfilled their obligations. But there were certain amendments of the Contributory Pensions Act that could and should be made at once. The object of this Bill was to make those amendments. The main principle of the measure was to bring within the scope of the pensions scheme persons of the same class as those for whom the original Act was intended, and who by pure accident were at present excluded from its provisions. Under this proposal would be brought within the scheme as a whole all those women whose husbands could not participate because they were over 70 when the Act came into operation, or because they died before the appointed date of the Act of 1925. At the same time opportunity had been taken to relax certain restrictions which experience of the working of the Act had shown to be necessary, and to enlarge some of the provisions which experience had shown to be desirable. By July 1st, 1930, something like 210,000 pre-Act widows would be brought within the scope of the Bill for pensions. These would be the elderly widows who were over 60. On Jan. 1st, 1931, there would be brought within the scope of the Bill the class of widows between 55 and 60 amounting to 85,000. That meant that about 200,000 widows would begin to benefit as soon as they reached the age of 55. Provision was being made for round about 500,000 pre-Act widows in the present Bill. He emphasised that number, because to-day there were about 200,000 post-Act widows receiving pensions. The Bill also proposed to do something for the pre-Act widows with dependent children. By prolonging the right to pension until the youngest child reached the age of 16, about 18,000 widows would receive this benefit. Finally, old age pensions would be given at 65 to 24,000 wives of men who happened to be over 70 before pensions began to be paid.

For the period up to 1936 the additional expenditure would cost on an average about £8,000,000 a year. The Chancellor of the Exchequer proposed to increase the Treasury contribution from £4,000,000 to £9,000,000 a year; but in 1936—with the flat £4,000,000 contribution—a very substantial increase in the State contribution would be required. In order to reach the day of larger contributions by easy stages the Chancellor of the Exchequer proposed each year to increase the State contribution by £1,000,000 until it reached, under the proposals before the House and the present Act, a maximum of £21,000,000 a year.

The Bill was read a second time.

NEW BILLS INTRODUCED.

On Friday, Nov. 1st, Mr. G. HIRST presented a Bill to amend Subsection (4) of Section 9 of the Workmen's Compensation Act, 1925.—Mr. ALPASS presented a Bill to consolidate and amend enactments relating to midwifery, &c. Both Bills were read a first time.

UNEMPLOYMENT SCHEMES AND PUBLIC HEALTH.

On Monday, Nov. 4th, Mr. J. H. THOMAS, Lord Privy Seal, made a statement in which he described the progress of his plans for dealing with unemployment. Referring to the severe drought experienced during the past summer, the right hon. gentleman said that every water authority in the country ought to be alive to the dangers of such a situation, and there would be no excuse if there was a repetition next year of the dangers and hardships which the nation had passed through. He had circularised all the authorities and those responsible for water supplies, both large and small, and he was able to announce that included in the £11,000,000 which was to be spent on schemes already approved was a considerable number of large water schemes. No water authority would be held blameless next year if they had failed to take advantage of the opportunities now afforded to them.

During the debate which followed Mr. Thomas's statement—

Sir R. ASKE suggested that something might be done to deal with the unemployment in the building and allied trades, which represented 12 per cent. of the whole problem. There was a large amount of frightful overcrowding in all the great industrial centres. This had a very bad effect on the health of the people. The Government should take their courage in both hands and deal with this overcrowding.

Mr. THOMAS said that one of the first measures of the Government this session would be a Slum Clearance Bill to deal with one side of the housing problem. He had urged the municipalities to take advantage of the Government's facilities to help them to undertake work which ought to have been done long ago. That offer was still open.

Sir R. ASKE, while expressing satisfaction at Mr. Thomas's statement, said that slum clearance would not meet the difficulty. There was an actual shortage of houses, and they must build more houses before they destroyed the slums. The health of the people was suffering, and if the Government did not build the houses now they would have to build hospitals in future. The Government should find out how many houses were necessary, and provide one house for one family, if possible. If they did that, they would greatly benefit public health and would save a vast sum which otherwise would have to be spent in future on public health services.

PROTECTION OF DOGS BILL.

On Nov. 4th Sir R. GOWER presented a Bill to prohibit the vivisection of dogs. The Bill was read a first time.

HOUSE OF COMMONS.

THURSDAY, OCT. 31ST.

Washington Eight Hours Convention.

Sir NICHOLAS GRATTAN-DOYLE asked the Minister of Labour when it was proposed to introduce the measure to give effect to the Washington Hours Convention.—Miss BONDFIELD replied: I hope to introduce the Bill at an early date.

Various Industries (Silicosis) Order.

Mr. HOLLINS asked the Home Secretary when he proposed to make an order to extend the present Various Industries (Silicosis) Order, so as to make provision for the payment of compensation in the case of partial incapacity due to silicosis.—Mr. CLYNES replied: I am anxious to provide for the partial disablement cases as soon as practicable, but adequate medical arrangements must first be made. As my hon. friend is aware, this difficult question has been under investigation by a Departmental Committee. The Committee has now reported, and a copy of the Report has been laid before Parliament. I concur generally in the arrangements recommended, but I am advised that they cannot be given effect to without further legislation. I am accordingly considering an amending Bill, which I hope may be introduced and passed into law during the present session.

Mr. HOLLINS asked the Home Secretary if he was aware of the abnormal number of cases of silicosis in the pottery industry for which compensation had been paid since Feb. 1st last, when the Various Industries (Silicosis) Order came into operation; and whether, in view of the serious nature of the incidence of silicosis amongst pottery workers, he would appoint a committee of inquiry to consider and report as to amendments to the present lead and dust regulations required to give adequate protection to the health of the workers engaged in the pottery industry.—Mr. CLYNES replied: A certain number of cases have come to the notice of the Department but I have no complete figures. As my hon. friend knows, the question of further preventive measures was very carefully investigated in 1927 to 1928 by a Departmental Committee (of which he was a member), which recommended various additional precautions, including periodic medical examinations in some of the most dangerous processes. It is intended to give effect generally to the proposals of the Committee, but I am not sure how far it may be practicable or desirable to attempt to deal with the subject pending the establishment of the new medical arrangements to which I referred in my reply to the last question. So far as I am aware, there is no need for the appointment of any further Committee.

Tannic Acid Treatment for Burns.

Dr. VERNON DAVIES asked the Home Secretary if he proposed to issue any instructions to factories and workshops in reference to the tannic acid treatment for burns.—Mr. CLYNES replied: The value of this method in the treatment of cases in hospital is demonstrated by the recent Report of the Medical Research Council, but its application to the first-aid treatment of minor cases of burns, which form a great majority of the cases at factories and workshops, would not appear to have been explored. The Senior Medical Inspector of Factories has been asked to go into this, and the matter will be further considered on his report. Meanwhile I am hardly in a position to issue any instructions.

Experiments on Living Animals.

Mr. FREEMAN asked the Home Secretary whether his attention had been called to the further increase in the number of experiments on living animals, especially without anæsthetics, being 300,915 during 1928 and 44,073 more than in 1927; and whether he would consider the desirability of setting up a full inquiry into the matter with a view to preventing this practice, paid for in many cases by public funds.—Mr. CLYNES replied: The answer to the first part of the question is in the affirmative. The increase of experiments under Certificate A (i.e., without anæsthetics) is largely, if not entirely, due to an increased use of animals for the purposes of standardising drugs for use in medical practice, of diagnosing the diseases of patients under treatment, and of testing the purity of milk and other foods in the interests of public health. The whole question of experiments on animals was very carefully and thoroughly investigated by the Royal Commission on Vivisection which reported in 1912; and I do not consider that a further inquiry is called for.

Nursery Schools.

Mr. KELLY asked the President of the Board of Education the number of nursery schools in operation; and whether proposals were made for the opening of nursery schools in other areas.—Sir CHARLES TREVELYAN replied: The number of nursery schools in operation under the Board's regulations in England and Wales is at present 29. There are, in addition, 15 proposals before the Board for the establishment of nursery schools, and the provision of such schools is under consideration in a number of other areas.

Pollution of the River Lee.

Captain AUSTIN HUDSON asked the Minister of Health whether he had yet concluded his inquiries into the pollution of the River Lee; and, if so, what action he proposed to take.—Mr. GREENWOOD replied: I have had an investigation made. The nature of the stream makes the pollution problem difficult in this case. There has been an improvement, but the conditions are still not satisfactory. I propose to confer with the authorities concerned.

Birth Control Information.

Mr. THURTLE asked the Minister of Health is he had received a resolution passed by a recent conference of the National Council of Women's Societies, asking that local authorities should be permitted to give information on birth control to married women who desire it; if he was aware that this resolution was passed by a large majority; and if he was proposing to take any action to carry out the wishes of this representative body of organised women.—Mr. A. GREENWOOD replied: I have received this resolution, though I have not been informed by what majority it was passed. The question has been considered by the Government, and they do not propose to depart from the policy hitherto followed in this matter.

Ministry of Health Staff.

Brigadier-General CLIFTON BROWN asked the Minister of Health what was the number of the personnel employed by the Ministry of Health on June 1st, 1929; what are the numbers at present employed; and what was the increase or decrease in the cost.—Mr. GREENWOOD replied: The number of personnel employed by my Department on June 1st was 5883; the present number employed is 6006. The approximate annual increase in cost is £35,500.

Medical Officers on Local Authorities.

Dr. VERNON DAVIES asked the Minister of Health if his attention had been drawn to the fact that under the Local Government Act, 1929, many district medical officers and public vaccinators who had been members of county councils and county borough councils were ineligible for future membership unless they forfeited their appointments; and, as the experience of such members in health matters was of much value, would he consider some means by which the services of these practitioners could, when desired, be utilised on such county and county borough councils.—Mr. GREENWOOD replied: This matter has been before the Royal Commission on Local Government. Their report will be issued shortly, and any recommendation made will be duly considered.

Medical Research in India.

Major GRAHAM POLE asked the Secretary of State for India whether any steps had been taken in regard to the scheme, sanctioned by the finance committee of the legislative assembly in January, to remove the central medical research institute to Dehra Dun; and whether, especially in view of the objection raised by the All-India Medical Association to the removal of the institute to Dehra Dun, where there would be an absence of clinical facilities and of the scientific coöperation available in larger urban centres, the Government will examine the possibility of reconsidering the scheme.—Mr. WEDGWOOD BENN replied: The latest information I have is that work had not been started at Dehra Dun on Sept. 2nd. I will bring my hon. friend's suggestion to the notice of the Government of India, but I understand that they have already received representations on the same lines from one or more medical associations in India.

Manufacture of Dangerous Drugs.

Mr. MANDER asked the Home Secretary what was the number of factories in this country engaged in the manufacture of opium, heroin, cocaine, and other noxious drugs; the amount of capital involved; and the number of employees.—Mr. CLYNES replied: Eight firms are at present licensed to manufacture medicinal opium, heroin, cocaine or morphine (i.e., pure drugs under the Acts): five to manufacture medicinal opium; one to manufacture medicinal opium, morphine, and heroin; one to manufacture morphine, heroin, and cocaine; one to manufacture cocaine. I have no information as to the amount of capital involved or the number of persons employed, but the number is certainly under 50. I am sending the hon. Member a copy of the Annual Report of the British Government to the League of Nations.

Hospital Treatment for Orthopædic Patients.

Brigadier-General WRIGHT asked the Minister of Health whether representations had been made by county councils to have the legal right, which they did not now possess, to assist all needy orthopædic patients without regard to technical group distinctions; and, if so, whether he was prepared to introduce legislation to confer this right on them.—Mr. GREENFIELD replied: Representations on this subject have been received from one county council. I am advised that under Section 14 of the Local Government Act, 1929, county councils will, as from April 1st next, be empowered to provide all necessary hospital treatment for orthopædic patients.

Typhoid in London Area.

Mr. DAY asked the Minister of Health the number of cases reported of typhoid, and the number of deaths that had occurred in the London area for the three months ended to the last convenient date; and whether his officers had been able to trace the origin of these outbreaks.—Mr GREENWOOD replied: As regards the first part of the question the particulars required are as follows:—

Enteric Fever (Typhoid and Paratyphoid).—Deaths of London residents occurring in London or in metropolitan institutions.

Week ending	Notifications.	Outside London.	Week ending	Notifications.	Outside London.
July 6	2	1	Sept. 7	9	2
,, 13	5	—	,, 14	17	3
,, 20	7	1	,, 21	6	1
,, 27	4	—	,, 28	6	—
Aug. 3	6	2	Oct. 5	5	—
,, 10	5	1	,, 12	23	1
,, 17	6	—	,, 19	30	3
,, 24	11	—	,, 26	41	3
,, 31	4	—			
	Total		.. ..	187	18

(In addition there were two deaths occurring in London of non-residents of the County of London. The notifications in these cases are not included above.)

As regards the recent outbreak in South-East London, which is responsible for the large increase in notifications this month, my officers have coöperated with the medical officers of health of the districts affected. I understand that the source of this outbreak has not yet been definitely traced, but there is reason to believe that the infection is no longer operative.

FRIDAY, NOV. 1ST.

Medical Examinations of Pensioners.

Mr. RAMSBOTHAM asked the Minister of Pensions (1) the frequency with which ex-Service pensioners had to be re-examined before medical boards; and whether, to avoid the constant anxiety to the men and the cost of the inspection, he could accelerate the rate at which pensions were being stabilised; and (2) what classes of great war pensioners had their pensions stabilised and which had not; and to which class belonged the men suffering with eye trouble.—Mr. F. O. ROBERTS replied: Pensioners are medically examined at such intervals only as is essential to determine the rate of compensation due to them. I have full sympathy with the hon. Member's desire that final awards should be made as soon as possible in all suitable cases. This is, in fact, the practice of the Department, and already more than four-fifths of the men on the pension list, suffering from disabilities of all kinds, are in receipt of final awards. This proportion applies also to cases of affections of the eye.

MONDAY, NOV. 4TH.

Opium Consumption in India.

Major GRAHAM POLE asked the Secretary of State for India whether the six inquiries instituted by the local governments concerned to inquire into the high consumption of opium in certain areas had been completed.—Mr. WEDGWOOD BENN replied: All but one of the inquiries have been completed.

Artificial Limb Fitting Centre.

Viscount ELMLEY asked the Minister of Pensions whether the artificial limb fitting centre now situated at Norwich would be transferred to Cambridge.—Mr. F. O. ROBERTS replied: Transfer of the centre referred to in due course is contemplated; Cambridge being the most central and convenient point in the area supplied by this centre.

Final Pension Awards.

Sir GEORGE BOWYER asked the Minister of Pensions in how many cases during the last five months pensions had been re-awarded on the ground that final awards should never have been made.—Mr. F. O. ROBERTS replied: Precise statistics are not available for broken periods, but I understand that the number of cases in which further awards have been made during the five months referred to is about 500.

River Pollution.

Rear-Admiral BEAMISH asked the Minister of Agriculture if the draft Report on river pollution had now been considered by the Standing Committee; and when the issue of the Report might be expected.—Mr. BUXTON replied: A draft report will be circulated this week to the members of the committee for their consideration. The Report will be published as soon as possible after it has been approved by the committee.

National Radium Trust.

Sir KINGSLEY WOOD asked the Minister of Health the amount of money expended to date by the National Radium Trust for augmenting the supply of radium for use in the treatment of the sick.—Miss LAWRENCE, Parliamentary Secretary to the Ministry of Health, replied: No disbursements have yet been made, but arrangements are being completed which will result in a considerable augmentation of the supply of radium during the present month.

Artificial Silk Manufacture and Public Health.

Mr. KELLY asked the Minister of Health whether reports had been received from areas in the neighbourhood of artificial silk factories as to the effect on health of the manufacture.—Miss LAWRENCE replied: Reports have been received from districts in which there are artificial silk works. These are substantially in accord with the views expressed in the Report of the Chief Alkali Inspector, to which reference is made in my reply of July 25th last to a question.

TUESDAY, NOV. 5TH.

Care of Mental Defectives in Kent.

Mr. ALBERY asked the Minister of Health what accommodation existed in Kent for the care of mental defectives and the number in such institutions on the last available date.—Mr. GREENWOOD replied: The following accommodation in the County of Kent, excluding the County Borough of Canterbury, is certified or approved for the reception of mental defectives at the instance of the Kent County Council:—

	Defectives over age 16.	
	Male.	Female.
Cranbrook P.L.I. ..	10 *	20
Dover P.L.I.	—	6
Eastry P.L.I.	20	24
Malling P.L.I.	—	14
Sevenoaks P.L.I. ..	10	20
Tenterden P.L.I.	—	118*
Tonbridge P.L.I.	40 males under 16.	
Totals..	Over 16: 40 males, 136 females. Under 16: 40 males, 66 females.	

* 66 under and 52 over age 16.

There are two further institutions for defectives within the county: (1) Princess Christian's Farm Colony at Hildenborough, Kent, for 71 male and 68 female defectives; but it is conducted by a voluntary body, and the Kent County Council receives no preference in the allocation of vacancies. (2) Darenth Training Colony, Dartford, an institution of the Metropolitan Asylums Board, but all future vacancies will be filled by cases arising in the London County Council area. The Kent County Council have purchased an estate known as Leybourne Grange, on which they propose to develop a colony for mental defectives. At present the mansion is being adapted for the accommodation of about 90 female patients. On Jan. 1st last the Kent County Council was responsible for 589 mental defectives in institutions or on licence therefrom. The return then furnished did not differentiate between cases detained in institutions in Kent and elsewhere, but I am informed that many Kent cases are sent on contract to voluntary institutions outside the county, and that 264 of the 589 patients were detained in institutions of the Metropolitan Asylums Board.

Shipbreaking Workers and Lead Poisoning.

Mr. WATSON asked the Home Secretary what precautions, if any, were taken by the Alloa Shipbreaking Company at Rosyth to safeguard the health of the workers engaged on burning against the dangers of lead poisoning.—Mr. CLYNES replied: It appears from a report by one of the medical

inspectors of factories who recently visited these works that this company devote great care to the prevention of lead poisoning. A doctor has been appointed to give medical supervision, and arrangements are made to transfer to other work burners who show signs of contracting, or being specially liable to, the disease. Steps are also taken to see that so far as possible men do not work in such a position as to be exposed to fumes from another burner. I am advised that there must necessarily be some risk of lead poisoning in this process, but the firm appear to be doing their best to reduce it to a minimum, and I am glad to say that the incidence of lead poisoning at the works has considerably decreased.

The Government and High Milk Prices.

Mr. WISE asked the President of the Board of Trade what action he proposed to take in view of the high cost of distribution of milk and of the disregard shown by the traders of the views expressed by himself and by the Food Council.—Mr. W. GRAHAM replied: The Government have considered the position of the Food Council with particular reference to the recent refusal of London milk distributors to conform to the Council's recommendations as to the retail price of milk in August last. I should like at the outset to state that the Government fully recognise the value of the work done by the Food Council, notwithstanding that since its inception in 1925 it has had no statutory basis and has been without power to require the production of information when it was not forthcoming voluntarily. I may add that neither the Food Council nor any other body has power to compel the observance of the Food Council's recommendations. In the opinion of the Government this position is highly unsatisfactory, and we intend to submit proposals to alter it early next year. The Government are of opinion that the interests of the consumer demand that investigation should take place not only in regard to foodstuffs, but also in regard to other necessaries of life. With this object in view, we propose to ask Parliament to set up a Consumers' Council which shall have power to obtain compulsorily any information that it may require for the purposes of its inquiries. The Government intend also to submit proposals enabling them to deal with trading interests which refuse to accept the views which the Government may reach after considering the recommendations of the Consumers' Council. As I have already indicated, it must be some months before the Consumers' Council can be set up. I am therefore asking the Food Council to remain in being for the purpose of carrying out investigations into such food questions as may arise meantime.

Obituary.

NINIAN McINTYRE FALKINER, M.D. DUB., F.R.C.P. IREL.

THE death of Dr. Ninian Falkiner occurred, after a short illness, on Oct. 30th, at the age of 74. Though his health had been unsatisfactory for some months past he was going about until ten days before his death.

Ninian Falkiner was educated at Trinity College, Dublin, and the Carmichael School of Medicine, and graduated as M.B. in 1884. He became a Fellow of the Royal College of Physicians of Ireland in 1891, and took his M.D. degree in 1900. He spent several years as a poor-law medical officer in the city of Dublin, until in 1900 he was appointed as medical superintendent of statistics in the General Register Office. He held this post for some 20 years, until he was retired on reaching the age-limit. He was for a term Vice-President of the Royal College of Physicians of Ireland, and served as examiner both in that College and in Trinity College. He was also lecturer in Vital Statistics in Trinity College.

A colleague writes of him that he was one of the most modest and self-effacing of men. "He never sought prominence, but he carried out any duties confided to him with a punctilious care. Seeking nothing for himself he was unwearied in finding opportunities for kindness to others. He never was known to utter an unkind word of others, and one cannot believe that he ever conceived an unkind thought. His memory will long be pleasant to all who knew him."

ANTONIUS JOSEPH MANASSEH, B.SC. LEEDS, M.R.C.S. ENG.

Dr. A. J. Manasseh, who died on Oct. 31st, had been superintendent since 1898 of the Friends' Missionary Hospital at Brummana, on the slopes of Mount Lebanon. Born at Beirut in 1866, he was of Syrian parentage, and was brought up in the Orthodox Greek Church. He was educated at the High School of the Society of Friends at Brummana, under Theophilus Waldmeier, founder of the Lebanon Hospital for the Insane. He studied at the Syrian Protestant College, Beirut (now known as the American University), and later came to England for his medical training. He took the degree of B.Sc. at the University of Leeds, and after studying at the London Hospital qualified in 1897, later proceeding to the M.D. degree of Constantinople. He was accepted as a missionary of the Friends' Foreign Mission Association in 1897, and after a year's work in Syrian villages he became superintendent of the Quaker medical work at Brummana. In Syria he built up a wide reputation as physician and surgeon, and patients came to him from all over the country. In 1915 he was taken into the Turkish Army as a medical officer, and after being stationed at Damascus, in charge of the typhus hospital there, he was moved to the military hospital at Baalbek, and then advanced to a field hospital at Toul Kerum. There he was taken prisoner by Allenby's army, in September, 1918. He was given medical work in charge of a prison hospital by the British, but was soon released and joined the relief unit of the Syria and Palestine Relief Fund. Although suffering bad health from his experiences, he refused to take any furlough until he had been able to meet the heaviest demands of the relief work. He has since worked at Brummana, where, at the time of his death, he was superintending the building of a new hospital.

"Last spring," writes Dr. Fortescue Fox, "I had the privilege of spending some hours with Dr. Manasseh at Brummana where he had so long been the leading spirit. We discussed the site on the plan of the new hospital by which he hoped to extend the influence of this medical and educational post in the Lebanon. We went together afterwards to Beirut, and everywhere he was welcomed as much for his presence as his advice. He was a fine example of his countrymen at their best."

In 1899 Dr. Manasseh married Henrietta, daughter of George Benington of Enfield. His widow is left with a son and a daughter.

DONATIONS AND BEQUESTS.—Mr. James Fleming Fyfe Jamieson, of Ruthven, Meigle, Forfar, left £1500 for the endowment of a bed in the View Park Nursing Home, and £5000 for various charitable pruposes.—Mr. William Gilman, of Hazelcroft, Alderley Edge, Cheshire, who left over £141,000, besides personal bequests, directed that failing certain trusts, the residue of the property to be divided as to one-half equally between the Royal Infirmary, Manchester, and the Ancoats Hospital, Manchester, and one-half for such other Manchester charities, hospitals, and institutions, and in such proportions and in such manner as his trustees may think fit.—Mr. Peter Bond Burgoyne, of Broadlands, Ascot, left £1000 to the National Hospital for Consumption, Ventnor.—Mr. Thomas Albert Turner, of Lynwood, Newtown, Montgomery, left £1000 to Montgomery County Infirmary, Newtown, for the endowment fund.—Mrs. Eliza Macloghlin, Wigan, bequeathed a legacy of £10,000 to the Royal College of Surgeons for scholarships to be founded in memory of her husband, the late Dr. E. P. P. Macloghlin, of Wigan.—Mr. James Tivendale Spence, of Halbeath, near Dunfermline, left £1000 to the Royal Infirmary, Edinburgh, and the residue of his trust estate to the Dunfermline and West Fife Hospital.—Mr. Robert Benjamin Field Thornton, of Headfield-road, Savile Town, Dewsbury, left £1000 to the Dewsbury and District General Infirmary to endow a Robert Benjamin Field Thornton bed.—Mrs. Martha Roberta Meharry, of Linden Mansions, Hornsey-lane, London, N., besides other bequests, left £1000 to the Royal Victoria Infirmary, Newcastle-on-Tyne, to endow a bed in King Edward's Ward to be named after her late brother, Dr. W. J. Davison.

Medical News.

UNIVERSITY OF OXFORD.—The following awards have been announced:—Welsh Prize: A. P. Meiklejohn. Theodore Williams Scholarships: A. H. Hunt (Human Anatomy), J. W. Litchfield (Physiology), and J. R. Braybrooks (Pathology). Radcliffe Scholarship in Pharmacology: J. R. Braybrooks and G. S. Grist (equal).

UNIVERSITY OF CAMBRIDGE.—At a congregation on Nov. 2nd the following degrees were conferred:—

M.D.—T. A. Butcher.
M.Chir.—John Gray.
M.B. and B.Chir.—J. St C. Elkington, R. A. P. Gray, Alan Maberly, S. S. Chesser, and J. F. Stent.
M.B.—S. D. Isaacs.
B.Chir.—A. T. Howell and C. E. Donaldson.

UNIVERSITY OF LONDON.—Mr. Edwin Deller, LL.D., previously Academic Registrar, has been appointed to the post of Principal of the University as from Oct. 1st, in succession to Mr. T. Franklin Sibly, D.Sc., now Vice-Chancellor of the University of Reading. In 1920, Dr. Deller was appointed assistant secretary to the Royal Society, but returned to the University in 1921 to take up the post of Academic Registrar. From June, 1928, to February, 1929, he was acting Principal Officer.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—A quarterly Comitia of the College was held on Oct. 31st, with Sir John Rose Bradford, the President, in the chair. The following were admitted Members of the College:—

Ilahi Bakhsh, Thomas Henry Booth Bedford, Heward Bell, Denis Hubert Brinton, Philip Ellman, Ishak Kirolos Gayid, Leslie Wakefield Hale, Isidore Liknaitzky, Michael Malk, Arnold Ashley Miles, Sinclair Miller, Minocher Bamanji Mody, Ganpat Bapuji Mohile, John Barrie Murray, John Henry Noble, Henry Edward Nourse, William Frederick Howson Ray, Cuthbert Lawson Stote, Bertrand Edward Tompson, Thomas à Beckett Travers.

Licences to practise were conferred upon 126 candidates (117 men and 9 women) who have passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board and have complied with the by-laws of the College. The following are the names and medical schools of the successful candidates:—

H. S. Atkinson, Oxford and London; G. O. Barber, Cambridge and St. Mary's; E. E. Barnett, London; G. H. Bateman, Oxford and King's Coll.; T. S. Belcher, London; F. Bell, Oxford and St. Thomas's; E. Bellamy, Guy's; J. H. Bentley, Cambridge and Univ. Coll.; J. A. K. Brown, Manchester; W. D. Brown, Cambridge and London; D. R. Buchan, Birmingham; P. C. Chakravorty, Calcutta and Middlesex; G. Clarke, Guy's; J. P. Collinson, Sheffield; S. C. S. Cooke, Middlesex; W. H. C. Croft, Birmingham; J. H. Cyriax, Cambridge and St. Thomas's; H. W. Davies, Oxford and King's Coll.; T. Davies, Cardiff and St. Bart.'s; C. D. D. de Labilliere, St. Bart.'s; H. B. A. R. Densham, Guy's; A. Eckford, Cambridge and Guy's; J. A. Edward, Manchester and St. Bart.'s; H. G. Edwards, Cardiff and St. Bart.'s; Lilian P. Edwards, Royal Free; M. P. Ellis, Univ. Coll.; J. F. Fisher, St. Bart.'s; B. M. Fonseka, Middlesex; A. M. Fratel, Bombay and Durham; L. Gabbe, Cape and Guy's; D. K. Gaitskell, Guy's; H. S. H. Gilmer, Cambridge and St. George's; R. McN. Glover, Cambridge and Westminster; P. E. Glynn, Leeds; C. G. Gordon-Wilson, London; G. H. A. Graetz, Cambridge and St. Bart.'s M. B. W. Gray, London; Bryneilen Griffiths, Cardiff and Charing Cross; E. Gwynne-Evans, Univ. Coll.; Verna Hackett, Adelaide and Westminster; R. H. Hadley, Melbourne, Y. A. A. Hammouda, Cairo and St. George's; Flora Hargreaves, Univ. Coll.; C. C. Harvey, Cardiff and Univ. Coll.; E. Harvey, Oxford and Middlesex; C. F. Hecker, Adelaide and London; Violet L. de A. Hickson, Westminster; F. K. S. Hirschfeld, Melbourne and London; H. B. Hodson, St. Thomas's; J. Hopton, St. Bart.'s; R. H. Hucknall, Birmingham; Mary A. Hughes, Cardiff and Charing Cross; E. F. Hunt, St. George's; C. S. Kah, Cambridge and St. Thomas's; K. S. Keele, Guy's; E. J. Kerr, Birmingham; H. Y. Khwaja, Bombay and London; N. Kramer, St. Bart.'s; M. Lee, Durham and Middlesex; E. E. Lewis, St. Mary's; W. D. Lovelock-Jones, Cardiff and Univ. Coll.; F. T. F. Lutter, Cambridge and St. George's; R. W. McConnel, Cambridge and King's Coll.; E. M. MacLachlan, Guy's; F. N. Marshall, Manchester; Eileen M. Massey, King's Coll.; N. D. Matson, Otago and Charing Cross; E. C. W. Maxwell, Cambridge and St. Thomas's; P. H. Merlin, Birmingham; T. J. Millin, Dublin; C. W. Morley, Cambridge and St. Mary's; I. B. Morris, Cambridge and Guy's; D. P. F. Mulvany, Charing Cross; W. D. Neill, London; J. N. O'Reilly, Oxford and Middlesex; B. W. Paine, Univ. Coll.; E. H. Parkinson, Birmingham; L. H. Peiris, Ceylon and King's Coll.; J. Petro, Cambridge and St. George's; I. E. Phelps, St. Bart.'s; R. F. A. Philpott, Oxford and St. Thomas's; T. B. Pitts, Guy's; F. Pomarantz and E. S. Pope, St. Bart.'s; A. C. Price and N. L. Price, Bristol; S. R. C. Price, King's Coll.; F. S. C. Pritchard, Guy's; C. F. H. Quick, Calcutta and St. Mary's; J. P. Raban, Middlesex; B. Ram, St. Thomas's; J. Richardson, Cambridge and Middlesex; Marjorie E. Roberts, Royal Free; J. A. Rogers, Calcutta and King's Coll.; T. N. Rudd, London; C. R. Salkeld, Oxford and St. Thomas's; L. Savronsky, London; J. G. Scadding, Middlesex; D. Sheehan, Manchester; B. C. Singh, Calcutta and Univ. Coll.; E. Sladen, Middlesex; F. J. G. Slater, Cambridge and Durham; J. H. Smith, Cambridge and St. Thomas's; J. O. Smith, Melbourne and St. Bart.'s; A. Somerville, Sheffield; P. D. B. Spence, Edinburgh and Guy's; F. R. Stansfield, Leeds; J. E. S. Stephens, Cambridge and St. Bart.'s; T. Stephens, Cardiff and London; M. Sternfeld, Freiburg and London; Muriel H. Steven, King's Coll.; G. D. Stilwell, St. Thomas's; H. J. Stracey, Madras and St. Thomas's; B. L. Taneja, Punjab and Guy's; J. M. Taylor, St. Bart.'s; T. H. E. Taylor-Jones, King's Coll.; E. G. Thomas, Cardiff and Univ. Coll.; J. C. T. Tregarthen, Guy's; C. E. H. Turner, London; G. S. Walker, Oxford and Univ. Coll.; C. J. Waring, London; J. H. Watkin, St. Bart.'s; K. Watman, Middlesex; V. W. L. Wells, Guy's; T. H. N. Whitehurst, St. Bart.'s; and T. H. Wilson, St. Thomas's.

Dr. John Hay, Dr. F. E. Fremantle, M.P., and Dr. J. B. Leathes were elected to the Council of the College, and Dr. E. P. Poulton gave faith as an examiner in medicine. Sir Francis Champneys was re-elected a representative of the College on the Central Midwives Board, and Dr. H. Letheby Tidy was elected a member of the committee of management. Dr. Robert Hutchison and Dr. James Collier were elected members of the Mackenzie Mackinnon Research Fund Committee. Dr. J. H. Abram and Dr. A. S. Barnes were re-elected to represent the College on the Court of Governors of the University of Liverpool and the University of Birmingham respectively, while Dr. A. S. Woodwark was re-elected as representative on the Central Council for District Nursing. The President announced that Surgeon-Commander Sheldon Francis Dudley had been appointed Milroy Lecturer for 1931, and that the Jenks Memorial Scholarship had been awarded to Francis Sansome Mitchell Heggs. He also announced that permission had been granted to the Ophthalmological Society to hold a reception at the College on April 3rd next on the occasion of its jubilee, and permission was granted to a request that the Savill Memorial Oration might be delivered at the College. The Registrar announced that Dr. J. W. Springthorpe, of Melbourne, had applied for the restoration of the diploma of Member which he had resigned in 1919.

A communication was received from the Home Office that by an Order of Council made on August 15th, 1929, Part III. of the Dangerous Drugs Act, 1920, has been applied to the esters of morphine and their respective salts, and to any preparation, admixture, and extract containing them.—A communication was also received from the University of Wales announcing that the Advisory Board of Medicine had been recently dissolved.—A report was received from Dr. Fremantle, who had represented the College at the Imperial Social Hygiene Congress held in London in July last, in which he commented upon the increased interest taken by the public in the subjects before the Congress.

Dr. R. A. Young presented reports from the Committee of Management concerning alterations in connexion with the regulations for the First and Final Examinations for the L.R.C.P., M.R.C.S.—Dr. Sidney Phillips presented the treasurer's annual statement of receipts and expenditure, and auditors were re-elected. Dr. Arnold Chaplin stated that among donations to the library during the last quarter was an account of the last illness of the Earl of Beaconsfield in the words of the late Dr. Mitchell Bruce.

After receiving the quarterly report of the examiners for the licence on the examination held in July last, the President dissolved the Comitia.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—Out of 15 candidates entered, the following 8 have passed the final professional examination and have been granted the diploma of L.D.S.:—

George Morton Smith McGibbon, Sugra Mohammed Ali, William Ainslie Elder Duncan, Walter Pearson Neilson, Robert Hugh Dewar, John Ellis Sprunt, Thomson Alexander Ferguson, and Donald Forbes Johnstone.

The following passed in the subject of pathology:—

Robert Kirkwood Nicol Clarkson and Robert Pearson Neilson.

UNIVERSITY OF DUBLIN.—On Saturday last Mr. William Pearson, surgeon to the Adelaide Hospital, Dublin, was elected Professor of Surgery in the University in succession to the late Mr. T. E. Gordon.

Mr. Pearson, who is a son of Mr. C. Y. Pearson, for many years Professor of Surgery at University College, Cork, was educated at Trinity College, Dublin, where among other achievements he won the Travelling Prize in Surgery. In 1910 he became a Fellow of the Royal College of Surgeons in Ireland, and in the same year was appointed assistant to the Professor of Surgery in Dublin University. During the war he was for some time engaged in work for the British Red Cross Society in France, and later as consulting surgeon in Sussex. He was twice mentioned in dispatches, and retired with the rank of lieutenant-colonel. Since then he has been surgeon to the Adelaide Hospital, Dublin, and to the University of Pensions Surgical Hospital at Blackrock.

WELLCOME HISTORICAL MEDICAL MUSEUM.—On Monday, Nov. 11th, at a reception to the Egypt Exploration Society, Mr. Warren Dawson will give an address on Egyptian Magic and Medicine. The reception will be at the Museum at 8.30 P.M.

HUNTERIAN SOCIETY.—A meeting of this Society will be held at The Cutlers' Hall, Warwick-lane, London, E.C., at 9 P.M., on Monday, Nov. 18th, when Earl Howe, Mr. E. B. Turner, and Dr. P. B. Spurgin will take part in a discussion on The Doctor and the Motorist.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—The annual dinner of this society will be held at the Piccadilly Hotel, London, W., on Thursday, Nov. 14th, at 7.30 P.M. (Reception at 7.10.) Tickets are obtainable from the Executive Secretary at 1, Upper Montague-street, Russell-square, W.C. 1.

BRITISH SCIENCE GUILD.—At 4.30 P.M. on Tuesday, Nov. 19th, at the Goldsmiths' Hall, Foster-lane, London, E.C., Sir Walter Fletcher, F.R.S., secretary of the Medical Research Council, will deliver the Norman Lockyer Lecture. His subject will be Medical Research: the Tree and the Fruit, and tickets may be had from the secretary of the Guild at 6, John-street, Adelphi, W.C. 2.

LONDON IRISH MEDICAL GOLFING SOCIETY.—At this society's week-end meeting at Sandwich there were 63 entries for the Canny Ryall Cup, and the winner was E. T. Wright. E. T. McElligott and C. Petit tied for the O'Malley Cup, and Petit won on a replay. For the Lett Cup D. S. Gordon and E. T. Wright tied with E. S. A. Crawford and C. L. Wilson; Gordon and Wright won the replay. The Cahill Trophy was won by D. R. Wheeler, the Captain's Prize by E. T. Wright, the Juniors' Prize by R. L. Rea, the Hidden Nine by D. R. Wheeler, and the Eclectic Competition by W. Calwell and D. R. Wheeler (tie).

COLLEGE OF PESTOLOGY.—The annual dinner and ball took place at the Piccadilly Hotel on Nov. 1st. Owing to the illness of the new President, the Duke of Sutherland, the chair was taken by Sir Thomas Horder, who pointed out that the intermediate host between the microbe and the human being was the pest, and that to deal with this intermediary was everybody's business, and therefore nobody's. He related the work of the College to the problem of slum-clearance, for as long as slums existed it was impossible to free the country of pests. The toast of the Society was proposed by Captain W. S. Saunders, M.P., and responded to by Mr. Moore Hogarth, who traced the continued usefulness of the College and declared that we were a bug-ridden country, and that it would be impossible to get all the bugs of the metropolis into a container as large as the Tower of London.

PRESENTATION TO DR. JANE WALKER.—A dinner was held at the East Anglian Sanatorium, Nayland, Colchester, on Oct. 24th, to celebrate the seventieth birthday of Dr. Jane Walker, its principal. Dr. G. E. Soltau presided, and Dr. G. H. Metcalfe proposed the toast of Dr. Jane Walker. He said that the sanatorium, which was opened nearly thirty years ago, was known not only in Suffolk and East Anglia, but throughout the world. Dr. Vere Pearson spoke of the vitality and enthusiasm shown by Dr. Walker, not only in her medical work but in her interest in music, literature, and art. The chairman said that many of the former medical residents and matrons had desired to join in giving Dr. Walker a tangible expression of their feelings towards her. She handed a bag of gold from past and present patients and members of the staff of the sanatorium to Dr. Walker.

FINANCE OF THE MIDDLESEX HOSPITAL.—The report for 1928, which has just been issued, again shows a considerable expansion of work. At 6271 the number of in-patients treated to a conclusion was an increase of 759, and the average number of occupied beds was 340·18, compared with 329·45 in 1927. The increase is partially accounted for by the provision of facilities at the convalescent home for surgical cases at an earlier stage of convalescence. A decrease in costs has resulted, the average weekly cost of each in-patient having fallen by 1*s.* 7*d.* to £4 15*s.* 1·15*d.*, and the total cost per head from £15 1*s.* 4·46*d.* to £13 9*s.* 8·68*d.* The number of out-patients (52,580) is an increase of 3562. There was a fractional increase in the cost in this department, a greater proportion of the time of the dispensary staff having been required owing to the growth in the number of patients. The larger number of resident patients increased the expenditure by £1996 to £100,068, which the governors regard as very satisfactory in view of the cost of the contributory superannuation scheme. The total income went up from £80,177 to £83,515. The grant from the Hospital Saturday Fund fell from £4475 to £3230. The recommendations of a joint committee of the governors and the medical committee are resulting in better conditions for the nursing staff.

QUEEN ALEXANDRA'S HOSPITAL FOR OFFICERS.—The tenth annual reunion dinner of this hospital was held on Oct. 30th at the Hotel Cecil, under the chairmanship of Major W. B. Binnie, a former patient. Mr. Herbert Paterson read a message of good wishes from the Princess Victoria; Lord Waring proposed the health of the former patients, and Colonel F. R. Hybart, the senior officer, replied.

UNIVERSITY OF BIRMINGHAM DENTAL CLINICAL BOARD.—Four post-graduate lectures will be given at the Dental Hospital, Great Charles-street, Birmingham, at 5 P.M., on Thursdays, Nov. 14th and 28th, and Dec. 5th and 12th. The first lecture will be by Mr. Harold Round on Fractures of the Jaws. Further particulars may be had from the Clerk to the Board at the University.

A RADIUM CANCER CLINIC.—Lord Moynihan, President of the Royal College of Surgeons, last week opened a radium cancer clinic at Burnley Victoria Hospital, of which Dr. J. H. Watson has been appointed director. It is proposed that the clinic should have 1 g. of radium; the first instalment, already in use, consists of 340 mg.

A LICENSED VICTUALLER'S BED.—A bed in the Victoria ward of St. John's Hospital, Lewisham, has been endowed by the Blackheath Division of the Licensed Victuallers and Beersellers' Protection Society.

PRESENTATION TO A MEDICAL MAN.—Last week a presentation was made to Dr. G. S. Pollard on his retirement, after 23 years' service, as honorary medical director of Paulton Memorial Hospital, near Bristol. He has been a member of the medical staff for 43 years. The presentation, from the members of the medical and nursing staffs and the management committee of the hospital, consisted of an armchair, a cheque, and an album containing the names of the subscribers.

THE ROYAL FAMILY AND HOSPITALS.—On Monday Princess Marie Louise laid the foundation-stone of the new Queen Charlotte's Maternity Hospital at Hammersmith.—Last week Princess Louise, Duchess of Argyll, opened a new isolation hospital (60 beds) which has been built by the Hendon urban council, at an approximate cost of £70,000.—The new X ray department of Wembley Hospital has been opened by Prince Arthur of Connaught. The foundation-stone of the institution was laid exactly three years ago, and the hospital, which cost nearly £30,000, was opened free of debt. The accommodation is already insufficient, and plans are being made for enlargement.—On Thursday in last week the Duke of York opened a new pavilion of Grindon Hall Tuberculosis Sanatorium belonging to the corporation of Sunderland.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, Nov. 11th.—5 P.M., WAR. Paper:—Lieut.-Colonel T. B. Layton: The Surgical Aspects of the Transport of the Wounded.

TUESDAY.—5 P.M., THERAPEUTICS. Communication:—Dr. J. H. Burn, Dr. S. Wokes, and others: The Use of Ergot. A discussion will follow. 8.30 P.M., PSYCHIATRY (at the Wellcome Historical Medical Museum, 54, Wigmore-street, London, W.). Presidential Address:—Sir Robert Armstrong-Jones: Superstition.

WEDNESDAY.—5.30 P.M., SURGERY: SUBSECTION OF PROCTOLOGY. Pathological Meeting preceded by a discussion on Complications of Operations for Piles, to be opened by Mr. Cecil Rowntree (President of the Subsection). Cases and Specimens:—Mr. Cecil A. Joll: Combined Abdomino-perineal Excision of the Rectum and Wertheim's Hysterectomy for Carcinoma of the Recto-vaginal Septum: Abdomino-perineal Excision of Rectum for Endometrioma. Mr. E. T. C. Milligan: Specimen Illustrating Early Carcinoma of the Colon; Two Cases Illustrating Peri-rectal Swellings. Mr. Lionel Norbury and others will also show specimens.

THURSDAY.—8.30 P.M., NEUROLOGY. Clinical Meeting at the National Hospital, Queen-square, W.C.

FRIDAY.—5 P.M., BALNEOLOGY. Paper: Dr. G. L. Kerr Pringle. 8 P.M., OBSTETRICS. Specimens: Mr. Clifford White will show two specimens. Short Papers:—Dr. J. Estcourt Hughes: A Case of Hydatidiform Mole with Multiple Small Syncytial Infarction of the Lungs. Dr. Kathleen Vaughan: Maternal Mortality and its Relation to the Shape of the Female Pelvis. Discussion on the Report of the Departmental Committee on the Training of Midwives. Opener: Dr. Herbert R. Spencer. 8.30 P.M., ELECTRO-THERAPEUTICS. Paper:—Dr. Jessie E. Sheret: Massive Collapse of the Lungs.

BIOCHEMICAL SOCIETY.

SATURDAY (to-day), Nov. 9th.—2.30 P.M. (in the Department of Physiology, University of Liverpool): 129th Meeting.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, Nov. 11th.—8.30 P.M., Discussion on the Relative Value of the Different Methods of Diagnosis in Gastric Disease, to be introduced by Dr. J. A. Ryle, Dr. Harrison Orton, and Prof. E. C. Dodds.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.
TUESDAY, Nov. 12th.—5 P.M., Dr. G. F. Still: The History of Paediatrics in the Seventeenth and Eighteenth Centuries. (Last FitzPatrick Lecture.)
THURSDAY.—5 P.M., Rt. Hon. H. A. L. Fisher: An Oxford Movement (Lloyd Roberts Lecture).

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.
THURSDAY, Nov. 14th. — 5 P.M., Mr. R. P. Rowlands: Review of the Surgery of the Gall-bladder and Bile-ducts. (Bradshaw Lecture.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.
MONDAY, Nov. 11th, to SATURDAY, Nov. 16th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square. Mon., 5 P.M., lecture by Dr. E. P. Poulton on (1) Treatment for the Common Cold, and (2) Recent Work on Bright's Disease. No fee. Two lectures especially suitable for M.R.C.P. candidates: Tues., 8.30 P.M., Dr. O. L. V. de Wesselow: Diabetes and Insulin. Fri., 8.30 P.M., Dr. Bernard Myers: Purpura and its Treatment.—CHARING CROSS HOSPITAL, W.C. Wed., 2 P.M., Demonstration of Gynæcological Cases by Dr. Everard Williams. No fee.—ST. PAUL'S HOSPITAL, Endell-street, W.C. Fri., 4.30 to 7.30 P.M., Demonstration of Genito-urinary Cases and Cystoscopic Examinations by Mr. W. K. Irwin. No fee.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. Special Post-graduate Course in Medicine, Surgery and Gynæcology, every afternoon and some mornings for two more weeks.—LONDON LOCK HOSPITAL, Dean-street, W. Post-graduate Course in Venereal Disease. Daily every afternoon and evening. Further particulars from the Fellowship of Medicine.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Nov. 11th.—10 A.M., Dr Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Mr. Sinclair: Surgical Wards.
TUESDAY.—10 A.M., Medical Registrar: Medical Wards. 2 P.M., Dr. Shaw, Medical Out-patients. 2.30 P.M., Sir Henry Simson: Gynæcological Operations.
WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2.30 P.M., Mr. Donald Armour: Surgical Wards. Dr. Scott Pinchin: Medical Out-patients.
THURSDAY.—11.30 A.M., Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Department. 2 P.M., Mr. MacDonald: Genito-Urinary Department. 4.30 P.M. (Lecture), Dr. Dowling: Dermatological Operations.
FRIDAY.—10 A.M., Dr. Pritchard: Medical Wards. 12 noon, Dr. Shaw: Clinical Demonstration. 2 P.M., Mr. Vlasto: Throat, Nose and Ear Department.
SATURDAY.—9 A.M., Mr. Vlasto: Throat, Nose and Ear Operations. 9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Children's Department.
Daily, 10 A.M. to 5 P.M., Medical, Surgical and Special Out-patients, Operations, Ward Visits, Anæsthetic Courses.

SOUTH-WEST LONDON POST-GRADUATE SOCIETY, St. James's Hospital, Ouseley-road, Balham, S.W.
WEDNESDAY, Nov. 13th.—4 P.M., Dr. C. E. Lakin: Demonstration of Cases.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, Nov. 11th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat and Ear Clinics. Operations.
FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases Clinics. Operations. 4.30 P.M.: Demonstration on Practical Neurology by Dr. L. R. Yealland.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Nov. 11th.—12 noon, Dr. Greenfield: Pathology of Nervous System. 2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Mr. Leslie Paton: Affections of Optic Nerves.
TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Purdon Martin: Tumours of the Cerebral Hemispheres.
THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Gordon Holmes: Ocular Palsies.
FRIDAY.—12 noon, Dr. Purdon Martin: Anatomy and Physiology of Nervous System. 2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. Greenfield: Demonstration of Cerebral and Spinal Tumours.

LONDON SCHOOL OF DERMATOLOGY, 49, Leicester-square, W.C.
TUESDAY, Nov. 12th.—5 P.M., Dr. Wilfred Fox: Nævi.
THURSDAY.—5 P.M., Dr. H. G. Burford: Pathology Demonstration.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, Nov. 13th.—4.30 P.M., Sir Thomas Carey Evans: Stone in the Bladder, with Special Reference to Treatment by Litholapaxy.

KING'S COLLEGE FOR HOUSEHOLD AND SOCIAL SCIENCE, Campden Hill-road, W.
FRIDAY, Nov. 15th.—5 P.M., Prof. V. H. Mottram: Human Nutrition. (Fifth of six lectures.)

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.
MONDAY, Nov. 11th.—5 P.M., Prof. Leonard Hill: Sunlight and Health.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road.
FRIDAY, Nov. 15th.—4 P.M., Mr. W. A. Mill: Acute Suppuration of the Middle Ear.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
TUESDAY, Nov. 12th.—3.15 P.M., Mr. C. S. L. Roberts: Prolapse in Women.

PEOPLE'S LEAGUE OF HEALTH, 12, Stratford-place, W.
FRIDAY, Nov. 15th.—6 P.M. (at the Medical Society of London, 11, Chandos-street, W.), Mr. Harold Cox: The Multiplication of the Unfit.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Nov. 13th.—4 P.M., Dame A. Louise McIlroy: The Influence of Pathology Upon Maternal Welfare.

ROYAL ANTHROPOLOGICAL INSTITUTE.
WEDNESDAY, Nov. 13th.—5.30 P.M. (in the Polytechnic Hall, Great Portland-street Extension), Sir Arthur Keith: Race Building—Past and Present.

ANCOATS HOSPITAL, Mill-street, Manchester.
THURSDAY, Nov. 14th.—4.15 P.M., Mr. P. McEvedy: Diseases of Veins.

UNIVERSITY OF SHEFFIELD POST-GRADUATE CLINICS.
FRIDAY, Nov. 15th.—3.30 P.M., Mr. H. B. Yates: Dyspepsia of Biliary Origin.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, Nov. 12th.—4.15 P.M., Dr. T. H. Oliver: Diabetes.
FRIDAY.—4.15 P.M., Dr. H. Herd: Behaviour Disorders of Childhood.

Appointments.

MORTON, E. F., L.R.C.P. Lond., M.R.C.S., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Topsham District of the County of Devon.
MCMILLAN, A. J., L.R.C.P. Lond., M.R.C.S., Tuberculosis Officer for North Devon.
RATNER, E., M.B., Ch.B. Manch., Assistant Medical Officer of Health, Stockport.

Vacancies.

For further information refer to the advertisement columns.

Altrincham General Hospital.—H.S. At rate of £125.
Barnsley, Beckett Hospital, &c.—H.P. £140.
Barry Surgical Hospital.—H.S. At rate of £200.
Bedford County Hospital.—H.S. At rate of £175.
Birmingham City.—Asst. M.O. £750.
Birmingham, Dudley-road Hospital.—Surgeon. £700.
Birmingham, Queen's Hospital.—Jun. R.S.O. £100.
Birmingham Royal Cripples Hospital.—H.S. At rate of £200.
Birmingham, Highbury Hospital.—Res. M.O. £350–£400.
Blackburn and East Lancashire Royal Infirmary.—Fourth H.S. £130.
Bolingbroke Hospital, Wandsworth Common, S.W.—Res. M.O. £200. Also Clin. Asst. to Ear, Nose and Throat Dept. £100.
Brighton, Hove and Preston Dispensary and Hove Hospital.—Hon. Surgeon.
Brighton, Royal Sussex County Hospital.—Sen. Asst. Path. £350.
Church Army Medical Mission.—Lady Doctor.
City of London Hospital for Diseases of Heart, &c., Victoria Park, E.—Res. M.O. £250. Also H.P. At rate of £100.
Bristol, Stoke Park Colony.—Director of Medical Services. £1200.
Derby County Borough.—M.O.H. £1100.
Durham County Council.—Asst. Welfare M.O. £600.
Elizabeth Garrett Anderson Hospital, Euston-road.—H.P. Obst. Asst. Three H.S.'s. Each at rate of £50. Also Clin. Assts.
Great Yarmouth General Hospital.—Jun. H.S. £125.
Harrogate Infirmary.—Sen. and Jun. H.S. At rate of £150 and £100 respectively.
Hertford County Hospital.—H.P. At rate of £150.
Ipswich, East Suffolk and Ipswich Hospital.—Hon. Ophth. Surgeon.
Ipswich, Heathfields Infirmary, &c.—Asst. Res. M.O. £250.
Islington Dispensary, 303, Upper-street, N.—Asst. Res. M.O. £220.
L.C.C. Mental Hospital Service.—Eighth Asst. M.O. £300.
Leamington Spa, Warneford General Hospital.—Res. H.S. £165.
Leeds General Infirmary.—M.O. in charge of Radium Dept. £600.
Liverpool, David Lewis Northern Hospital.—Hon. Med. O. for Cardiographic Dept. Also Two Jun. Anæsthetists. £75.
Liverpool Royal Babies Hospital, Woolton.—Res. M.O. At rate of £90.
London Jewish Hospital, Stepney Green, E.—Res. M.O. Also Jun. Res. M.O. At rate of £150 and £100 respectively.

London Skin Hospital, 40, Fitzroy-square, W.—Hon. Phys. and Hon. Pathologist.
Manchester City.—Asst. Tuber. O. £650.
Manchester, Salford Royal Hospital.—H.P. At rate of £125.
Mothers' Hospital, Clapton, E.—Hon. Asst. Obstet. S.
National Association for the Prevention of Tuberculosis, 1, Gordon-square, W.C.—Asst. Med. Commissioner. £700.
National Hospital, Queen-square, W.C.—Res. M.O. £200.
Newark Hospital and Dispensary.—Res. H.S. At rate of £150.
Northwood, Mount Vernon Hospital.—H.S. for Cancer Section. £200.
Paddington Green Children's Hospital, W.—H.S. At rate of £150.
Queen's Hospital for Children, Hackney-road, E.—Surgeon to Ear, Nose and Throat Dept. Also H.S. At rate of £100.
Radium Institute, Riding House-street, W.—Assistant to Medical Department. £600.
Ross Institute.—Bacteriologist for South Africa.
Royal Chest Hospital, City-road, E.C.—Clin. Assts.
Royal College of St. Katharine, Poplar, E., Maternity and Child Welfare Centre.—Asst. M.O. £1 11*s.* 6*d.* per session.
Royal Free Hospital, Gray's Inn-road, W.C.—H.S.'s, H.P.'s, &c. Each £150. Second H.P. and Obstet. Dist. Asst. £100. Surg. Reg. £200. Half-time Gynæcological Reg. and Med. Reg. Each £100.
St. John's Hospital, Lewisham, S.E.—Phys. to Children's Dept. Also Cas. O. At rate of £100.
St. Peter's Hospital, 74, Vallance-road, Whitechapel, E.—Med. Supt. £900.
Sheffield, Children's Hospital.—H.P. Also Third Res. M.O. Each £100.
Sheffield, Jessop Hospital for Women.—Asst. H.S. At rate of £100.
Sheffield Royal Infirmary.—Clin. Asst. to Ophth. Dept. Also Clin. Asst. to Med. Depts. Each £250. Also H.S. £80.
Sheffield University, Faculty of Medicine.—Lecturer in Pathology. Also Demonstrator in Pathology. Each £500.
Southampton County Borough Isolation Hospital.—Res. M.O. £360.
Southampton, Royal South Hants and Southampton Hospital.—Asst. H.S. and Res. Anæsthetist. At rate of £140.
South London Hospital for Women, South Side, Clapham Common, S.W.—Clin. Asst. 1 gn. per attendance.
West London Hospital, Hammersmith-road, W.—H.P., H.S. Aural and Ophth. H.S. and Asst. Cas. O. Each at rate of £100. Also Asst. Surgeon Dentist.
Windermere, Ethel Hedley Hospital for Crippled Children.—Res. H.S. At rate of £150.
Wolverhampton Royal Hospital.—Asst. Pathologist and Pathological Registrar. £350.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Holyhead (Anglesey), Ryde (Isle of Wight), and at Wokingham (Berks).

Births, Marriages, and Deaths.

BIRTHS.

RUSSELL.—On Oct. 26th, the wife of Dr. N. L. Russell, of "Bredon," Alverstoke, of a daughter.

SHEPPARD.—At Rangoon, Burma, on Oct. 28th, to Edith T. Sheppard (*née* Marshall), M.B., B.S., wife of Lieut.-Col. A. L. Sheppard, I.M.S.—a son.

DEATHS.

GALLIMORE.—On Nov. 1st, at Leam-terrace, Leamington Spa, Thomas Gallimore, L.R.C.P., L.R.C.S., in his 80th year.

*N.B.—A fee of 7*s.* 6*d.* is charged for the insertion of Notices of Births, Marriages, and Deaths.*

RADIUM AT NORFOLK AND NORWICH HOSPITAL.—It is stated that two members of the honorary surgical staff of this hospital have privately acquired a small quantity of radium, and that hospital patients are now being treated with it.

LONDON VOLUNTARY HOSPITALS.—King Edward's Fund has issued a review of the work and finance of 136 London hospitals in the last five years, which shows an increase during the period of 14 per cent. in the daily average of in-patients, of 11 per cent. in out-patients, and 20 per cent. in out-patients' attendances. At the end of 1928 there were 15,640 beds, or 1600 more than when the Voluntary Hospital Committee made its inquiry in 1924. The total income in 1927 of £3,267,000 rose in 1928 to £3,424,000. To this must be added £978,000 received for endowment and building, making a total for 1928 of £4,402,000 for all direct hospital purposes. Subscriptions and donations have largely increased during the five years, and patients' payments have reached a higher total in each year. The compilers of the review say that so far from the voluntary hospitals "fighting a losing battle," the very opposite is the truth, the statistics showing that they are strengthening their hold upon the confidence of the public.

Notes, Comments, and Abstracts.

THE LOCAL GOVERNMENT ACT IN RELATION TO VOLUNTARY HOSPITALS.*

BY W. P. NEWSHOLME, M.D., F.R.C.P. LOND.,
MEDICAL OFFICER OF HEALTH, CITY OF BIRMINGHAM.

APART from consultation between local authorities and the representatives of the governing bodies and staffs of voluntary hospitals in regard to the general scheme of transfer of institutions, the Local Government Act contains no direct indication of any repercussion on the position of the voluntary hospital, but the approaching union between poor-law and municipal institutions offers possibilities of mutual assistance, coöperation, and coördination between the municipal and the voluntary hospitals. I am not an advocate of the municipalisation of the voluntary hospital. The Local Government Act cannot conceivably have any such result, even remotely. The ideal should be the concurrent maintenance of voluntary and municipal institutions under conditions of friendly association, allowing each to learn from, and to coöperate with, the other

Hospital Officers.

Administrative.—The first essential for coöperation is community of knowledge and of interests, and readiness to exchange information in ways free from the stiffness of officialism and the diplomatic implications of official conversations. The Incorporated Association of Hospital Officers should form an admirable channel for this if its membership could be extended to include the officers of municipal and poor-law hospitals.

Social Workers.—The hospital almoner is found on the staff of some, but not all, voluntary and public hospitals. Her work is profoundly important for the effectiveness of the hospital, both by probing into and remedying domestic hindrances to recovery, and by maintaining supervision after discharge from hospital, as well as protecting the hospital finances. I look forward to the day when every hospital will have its social service section represented by an almoner's department. By the pooling of information through personal contact, as well as by the free discussion of principles and procedure, there should be established a great network of social service in relation to the cure of disease, corresponding with the great network of social services which public authorities have established for the prevention of disease. That correspondence should, in its turn, pass into a further stage of close linkage between the two. I should, for example, like to see the almoner's department making use of the unrivalled knowledge of the local authority's health visitors about the home conditions, difficulties, and idiosyncrasies of the working classes, to maintain a degree of after-care which is at present impracticable.

Nursing Staff.—We are all competing keenly against each other in seeking candidates to be trained as nurses in our several institutions, and that competition at present implies a good deal of waste and duplication of effort. I should like to see the day when our institutions, voluntary and municipal, will collaborate rather than compete in evolving a scheme, first of joint training for the preliminary knowledge which all require, and then of interchange of nurses, which shall make fuller and more even use of the magnificent facilities for all-round training which such a pooling would imply. The difficulties, both personal and administrative, of evolving such a scheme on any large scale are obviously enormous. If, however, the present shyness of entering the nursing services should increase, sheer necessity may one day drive us to the necessary degree of inventiveness. It is possible that a scheme for the training of nurses might be evolved on lines somewhat analogous to those followed by the training of medical students, with perhaps one or more central hostels into which would be drafted the probationers for the various hospitals coöperating in the scheme. Whether those probationers would be selected in the first instance by the matrons of the several institutions individually or coöperatively, or in some other way, would be a matter for consideration. In such hostels the probationer would receive the preliminary training common to all nursing institutions, and would then be detailed to one or other of the coöperating institutions to continue her training. Whether and to what extent a system of exchange of nurses between one institution and another would be practicable is not a point into which I can enter. Such a scheme would

* Substance of a paper read before the Midland Branch of the Incorporated Association of Hospital Officers at Birmingham on Oct. 24th, 1929.

only be an extension of arrangements which are already in effect for individual institutions.

Use of Hospital Beds and Out-Patient Departments.

It is possible to visualise a number of directions in which coöperation would be useful in the allotment of hospital beds. For example, it would be of value to any given hospital to know what medical, surgical, and special department accommodation is available at any given moment at other hospitals in the same area. It is conceivable that a central information bureau, receiving regular and frequent information—say twice a day—might be a source of convenience for all hospitals. Such a bureau might with advantage develop into a central clearing-house for the purpose of minimising the long periods of waiting for admission to particular hospitals. This problem of the long waiting-list is one of immediate practical importance. I do not anticipate that we are likely to see any radical alterations in our present arrangements for the interchange of patients between hospital and hospital. It may well be considered, however, whether the duplication of special departments on a large scale in general hospitals is as desirable as the alternative of making use to a greater extent of the corresponding special hospitals, and of maintaining at the general hospitals only small special clinics for consultation purposes rather than for systematised and detailed treatment. In some directions, —e.g., in the use by agreement of some particular hospital for treatment by X rays, instead of the multiplication of X ray treatment plants at a number of hospitals—simplification and saving of expense could result, as well as the ability to provide plant on a scale which is impossible when each hospital attempts to make its own provision.

Hospital beds are to be considered not merely from the point of view of treating patients, but also from that of training medical students. I should like to see the doors of all well-run hospitals, general and special in areas serving a medical school, thrown open to medical students under conditions implying systematic instruction in the direction in which the hospital in question is peculiarly capable of enriching the student's experience.

Occasional visits to out-patient departments in various parts of the country leave an impression that there are still faults to be found—long waiting, too casual directions in regard both to procedure and to treatment, and occasionally even cavalier behaviour by both professional and non-professional staff. The cause at present seems to be indefiniteness of control. What is needed is not so much technical knowledge as the acknowledged responsibility of some one individual for securing effective and kindly discipline in the out-patient department. The qualities needed would be those of a competent business man, combined with those of a capable housewife, and mellowed by an imagination quick to grasp the many anxieties and preoccupations of the applicant for help. There should be a possibility of pooling knowledge of the details of working of out-patient departments.

Joint Purchase of Supplies, Joint Laundries Joint Workshops.

There are no doubt two aspects to the question of joint purchase of stores and provisions by a group of institutions. While the joint purchase may readily imply a substantial saving in costs without any necessary loss in quality, it may not meet the special needs or the particular tastes of some of the coöperating institutions. Granted appropriate safeguards in the purchase of particular items, however, there is ground for careful consideration of the policy of joint purchase as already applied, for example, by a considerable combined group of municipal and voluntary hospitals in Birmingham. Joint laundry work is already in force for the municipal hospitals under the Birmingham Public Health and the Maternity and Child Welfare Committees. A case might also be made out for joint workshops for the preparation of a variety of surgical apparatus. With a large enough central workshop it should be possible to deal with the individual varieties of a particular type of appliance most favoured by individual hospitals.

Treatment of Mental Disease.

Scarcely any aspect of medicine is so fundamentally important and so much neglected as the detection and treatment of mental disease at its inception. Every important town should have in connexion with the out-patient departments of most if not all of the larger general hospitals a psychiatric clinic, run in close collaboration with the mental hospitals of the area; associated with this there should be a certain number of beds for the in-patient observation or treatment of appropriate cases. Such provision would immediately attract a class of readily curable patients who at present, and rightly, refuse to regard themselves as insane, and who consequently delay in seeking the all-important treatment which might save them later from a long period of confinement in a mental hospital. It is my earnest hope that some provision may be made on these lines for a very unfortunate and at present greatly neglected section of the population. The provision of such psychiatric clinics at general hospitals would have a profoundly important reverberation on the work of other departments of the hospital. Almost all physical disease has what might be called a mental overlap, an emotional state with a mental sensitiveness which adds greatly to the symptoms and delays recovery. The influence of the psychiatric clinic on the attitude towards disease in medical and surgical wards would tend towards a quicker cure, with less prospect of pronounced relapse or recurrence, for it would help the patient to clear up the mental concomitants of his physical disease. Moreover, it might well be that any tendency towards a return of those mental concomitants, the significance of which the patient had learnt, would tend to make him watchful and eager to seek early treatment.

Measures Towards the Prevention of Disease.

While hospitals, whether municipal or voluntary, have developed to a high degree of efficiency their powers of curing disease, they are at present only in the very early stages of developing a system for the maintenance of health, the prevention of disease, and the prevention of recurrence of cured disease.

(*a*) More specific, detailed, and systematic instructions could be given to individual patients as to the way in which they should conduct their lives after discharge from in-patient or out-patient treatment, with a view of minimising the risks of relapse or of progression of disease, and of detecting the further deviations from the normal at the earliest moment. Such advice is given even now, chiefly by ward sisters and resident staff; but it is usually verbal, and therefore too readily misunderstood or forgotten; and it is liable often to be rather casual. Such instructions could be rendered much more effective by a system of after-care.

(*b*) Ill-health has led frequently to degeneration of the patient's habits of body and mind. Patients should therefore have instructions on discharge, by individual tuition, by leaflets, or otherwise, on the bearing of firmly-established mental and physical habits, on stability of character and effectiveness of personality, and the influence of a desultory habit mechanism in rendering character ineffective, and in diminishing social value.

(*c*) Restoration of physical health releases fresh energies for the patient, and unless he is himself made aware of this, and warned of the importance of harnessing these energies to worthy ends, he may turn back to bad habits of body and mind formed during and as a result of ill-health, and may thus use these energies in directions tending to degradation. It may be that the hospital chaplain rather than the lay staff should face this problem; but it certainly should not be left unfaced, and I should not exempt the medical and nursing staff from their share of responsibility. I should like to lay particular emphasis on this need for recognising that the patient is not merely a physical body to be healed, but an individual with a personality whose point of equilibrium must necessarily be profoundly altered by the cure of his body, an individual with as urgent a need for adjustment of his personality to the now healthier body as was previously his need for the cure of that body.

(*d*) In out-patient departments of municipal and voluntary hospitals dealing with mothers and children much more advice could be given on training in habits, on character training, and establishment of mental stability. These are directions in which the modern view of the close inter-dependence of physical and of mental health require systematic elaboration in hospital practice.

A Problem with Two Faces.

The problem with which we are met—that of facing the ultimate alternatives of absorption into one service, of friendly coöperation between two types of services working side by side, or of rigidly separate services—the problem found in many spheres of individual, social, industrial, political and even religious life. It appears in the anti-thesis of individualism and socialism, of the small shop and the multiple emporium, of the self-contained business and the large combine, of the individual and the group, of self-expression and group membership, of Quakerism and Catholicism. The system of sharing experience, of socialism, of State service has inherent in it the defect that the individual, protected as he is from elimination by his membership of a large system, can subside too readily to a level of easy attainment below his full capacity, if he does not maintain his idealism of aim. The system of standing on one's own feet, of individualism, of the separate independent unit, has equally an inherent weakness. The representative of the system symbolised by the voluntary hospital may be liable to an over-absorption with his own affairs, and unconcern with the difficulties of neighbours, which can lead to a form of selfishness, preventing him from exercising the breadth of influence which might result from a nearer approximation to the system of community of

action. We need, therefore, be neither surprised nor troubled at the difficulties experienced in attaining a satisfactory working arrangement between the voluntary hospital unit on the one hand, and the group of State service units on the other. It is a difficulty which in varied disguises is inherent in human nature. As human nature tends when in equilibrium to find a happy mean between the two extremes, so we may expect to find the solution of our particular difficulties.

FIRST-AID TREATMENT OF BURNS BY TANNIC ACID.

PROVISIONAL instructions for applying the tannic acid treatment of burns under first-aid conditions have been drawn up by Mr. W. C. Wilson, author of the green book on this subject (No. 141 of the Medical Research Council Special Report Series), which was summarised in our columns last week. The instructions, which are included as an appendix to the report, have been modified by him in some respects as the result of helpful criticisms made by H.M. Medical Inspector of Mines, and by the professors of surgery at St. Thomas's Hospital and University College Hospital, London, to all of whom the original draft was submitted by the Medical Research Council. It is hoped that these instructions may prove useful, until fuller experience of the method has been gained in mines and other places where burning injuries are not uncommon, and where immediate hospital treatment may be unavailable.

The treatment here described is an emergency first-aid measure to be employed in cases especially where the patient is to be transported subsequently to hospital, and where the circumstances are such that some time—e.g., more than three hours—must elapse before the patient can reach hospital. If speedy removal to hospital is possible, first-aid treatment should be omitted, and the patient dispatched without delay.

A First-aid Unit.

A first-aid unit consists of the following articles:

(1) Two 2-pint enamel measures graduated in ounces.

(2) Two glass rods.

(3) Fifty packets of tannic acid powder; each packet contains 110 grs. of powder.

(4) A bottle containing tablets of corrosive sublimate. Each tablet contains 8·75 grs. Such tablets are stocked by all chemists.

(5) Five dozen packages of sterilised white surgeon's lint; each package consists of a piece of lint covered by a layer of gauze and wrapped in Kraft paper. The lint is in three forms: (*a*) A piece measuring 20 inches by 30 inches; this package is labelled "Trunk." (*b*) A bandage 4½ inches broad by 3 yards long; this package is labelled "Bandage." (*c*) A face-mask measuring 24 inches by 12 inches. In the mask a rectangular opening 7 inches by 1½ inches is cut to expose the eyes, and horizontal slits are cut 3 inches and 3½ inches long as openings for the nose and mouth respectively. The package is labelled "Face."

The unit contains one dozen "Trunk" packages, one dozen "Face" packages, and three dozen "Bandage" packages.

(6) Twelve rolls of white absorbent wool.

(7) Eight dozen gauze (open wove) bandages.

(8) A jar of vaseline and a flat stick for applying the vaseline.

Instructions in the Application of Tannic Acid.

(1) Remove all clothing from the burned area in order to make a rough estimate of the surface extent of the burn. Take great care that the patient does not become chilled.

(2) Do not attempt any cleansing of the burned area.

(3) Make up the tannic acid solution. In 2 pints of water dissolve one tablet of corrosive sublimate and four packets of tannic acid powder. Stir with a glass rod till all powder is dissolved. The solution must be warm when applied, otherwise the patient becomes chilled. This solution is antiseptic. There is no necessity to sterilise measures, glass rods, or powder. The following is a rough guide to the quantities of solution and lint required in the case of a male adult of average size: (*a*) The lint in a package labelled "Trunk" will cover the entire front or entire back of the trunk and requires *one* pint of solution. (*b*) The lint in a package labelled "Bandage" will cover one entire arm, and requires *half* a pint of solution. Two bandages cover one entire leg and require *one* pint of solution. (*c*) The lint in a package labelled "Face" will cover the face, neck, and sides of head, and requires *six ounces* of solution.

(4) According to the surface extent and regional distribution of the burn, select the number and type of packages which will provide enough lint to cover over the burned area. Remove the lint from the packages, soak it in the tannic acid solution, wring out gently, and apply the smooth side of the lint to the burned area. The hands should be washed thoroughly with soap and water before the lint is touched. Cover the lint with a layer of wool and fix with a gauze bandage.

(5) Burns of the face. *Take care that no tannic acid solution enters the eyes.*

Protect the eyes in the following way: Tell the patient to close his eyes and keep them closed. With the flat stick smear a *thick* layer of vaseline over the eyelids, eyebrows, and for some distance round the eyes. Cover the vaselined area with wool. Soak the face-mask in the solution, wring out *firmly*, squeezing out all excess solution, and apply to the face, leaving the regions of the eyes, nostrils, and mouth exposed through the openings cut in the mask for this purpose. Secure with a gauze bandage round the head and neck. The openings in the mask can be widened if necessary, or a face-mask can be improvised from a piece of lint in a "trunk" package by making the necessary openings.

Sterilisation and Storage.

(1) *Lint.* The packages with a covering of Kraft paper have previously been sterilised by steam at 15 lb. pressure for 20 minutes and dried. If the packages are kept clean and dry the lint will remain sterile for long periods.

(2) The whole unit is contained in a wooden box, which should be stored in a dry place. The lint packages and packets of tannic acid powder must be kept dry and clean. The packets of tannic acid powder are best kept in a separate tin box with a tightly fitting lid.

ENERGEN FOODS CO., LTD.

WE have received from this company forms of certificate which, upon signature by a medical man, will serve as an authority to any retailer to supply Energen Foods at a special reduction to the patient while the patient remains under treatment. The company claim that their wares are now generally recognised by the medical profession as useful in the dieting of diabetic and obese subjects, and those suffering from various digestive disorders, and a reduction of price will bring these foods within reach of panel patients.

JENNER AND THE CANADIAN PIRATE.

UNDER this heading the Hon. William Renwick Riddell, the Canadian Justice of Appeal, contributes an interesting story to the *Canadian Journal of Medicine and Surgery* for October, which shows that vaccination has been beneficent in other directions than that for which the originator of the practice intended it. Some will have heard that Napoleon, when about to refuse a request for the release of certain English prisoners, remarked, on being reminded by Josephine that the petitioner was Jenner, "Ah, we can refuse nothing to that name," and at that time Jenner's fame was great on the continent. In 1803, for example, the King of Spain equipped an expedition intended to diffuse knowledge of vaccination throughout the Spanish dominions in the new world, with the result that the practice spread rapidly; it was owing principally to this that the "Canadian Pirate," Jeremiah Powell, a son of William Dummer Powell, afterwards Chief Justice of the Court of King's Bench, Upper Canada, was released from a long term of what would have been practically slavery. The story, as Mr. Justice Riddell tells it, is as follows: Judge Powell married the daughter of one Dr. John Murray of Norwich, who was a close friend of Jenner. Jeremiah was placed by his father in a counting-house in New York, but, being of a restless nature, among other escapades, he took part in an expedition to free Venezuela from Spanish rule. He was captured, and sentenced to ten years' imprisonment in the Castle of Omoa, in the unhealthy province of Mexico, some of his colleagues being executed as pirates. Judge Powell, after an unsuccessful appeal to the Spanish Ambassador for his son's release, sailed to London with the intention of petitioning the King of Spain, and in the meantime had written to his brother-in-law, Charles Murray, in London. Charles Murray at that time had received a letter from Jenner referring to the success of the Spanish venture in vaccination, to which he replied referring to the sentence passed on his nephew, and mentioning the episode of Jenner's success with Napoleon, an episode that seems hitherto not to have been chronicled. He believed that Jenner might "have again the God-like satisfaction of being the means of setting the prisoner free." Jenner accordingly gave Judge Powell letters to the Court at Madrid, in response to which Jeremiah, the "Canadian Pirate," obtained his freedom. This the young man did not long enjoy, for shortly afterwards he was lost at sea, neither ship nor passenger being ever heard of again.

NEW LABORATORIES AT SHEFFIELD.—The students of the University of Sheffield are devoting the proceeds of this year's "rag" to the equipment of the new laboratories which are being erected at the Royal Infirmary.